110231

AT&T

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March 26, 1993

Mr. Patrick R. Anderson (3HW21)
Chief S. E. Pennsylvania Remedial Section
United States Environmental Protection Agency
Region III
841 Chestnut Building
Philadelphia, PA 19107

Dear Mr. Anderson:

In accordance with the Declaration for the Record of Decision for the C&D Recycling site in Foster Township, Pennsylvania dated September 30, 1992, I am attaching AT&T's technical submission which addresses and resolves the issue of the on-site containment cell and its ability to meet the State ARARS. This submission is within the 180-day time period identified in the ROD, and addresses and resolves (among other things) the issues of leachate collection, depth to groundwater and liner isolation distance.

In addition, I am attaching a copy of the Paoli Rail Yard Superfund site ROD which was issued in July of 1992. This ROD, which was approved by the PADER calls for the solidification and stabilization of the contaminants and disposal in an on-site "containment cell". A review of the ROD indicates that this remediation is very closely aligned with the C&D site issues. The new information presented here may be helpful to you in your review of the containment cell at C&D.

We appreciate in advance your efforts in the consideration of the attached documents.

If there are any questions or clarifications that you might need, please have your project manager contact Joe Chikowski on (908)204-8249.

Very truly yours,

Judy F. Dixon-Williams

Judy F. Dixon-Williams
Corporate Superfund
Manager

Copy (w/o att.) to:
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ON-SITE CONTAINMENT CELL TECHNICAL AND REGULATORY COMPLIANCE EVALUATION

C&D RECYCLING SITE
FOSTER TOWNSHIP, LUZERNE COUNTY
PENNSYLVANIA

29 March 1993

Prepared on behalf of:

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Section 1

1.0 *INTRODUCTION*

This document is intended to provide the United States Environmental Protection Agency (USEPA) Region III and the Pennsylvania Department of Environmental Resources (PADER) with additional information concerning the construction of an on-site containment cell at the C&D Recycling Site in Foster Township, Luzerne County Pennsylvania (hereinafter referred to as the Site).

Recent regulatory actions pertaining to the Site culminated in a Record of Decision (ROD) issued by the USEPA Region III office on September 30, 1992. In that ROD, the USEPA selected Remedial Alternative V. Alternative V is comprised of nine common actions in conjunction with stabilization of ash, soil and sediment (stabilized materials) and subsequent removal to an off-site disposal facility. The ROD also stipulated that the USEPA may modify its selection of Remedial Alternative V pending a demonstration that construction of an on-site containment cell, a component of Remedial Alternative VI, can provide an equally or more protective remedy which is cost effective and complies with all applicable, relevant and appropriate requirements (ARARs).

The Feasibility Study (FS) Report presented a detailed evaluation of a conceptual plan to construct an on-site containment cell at the Site for the purpose of isolating the stabilized materials. For the purpose of the evaluation in the FS, a specific area of the Site for construction of the on-site containment cell was identified. This area of the Site is referred to as the shale pit. The detailed evaluation in the FS Report focused on the shale pit area because it appeared to meet applicable criteria and was an existing depression. However, the focused evaluation in the FS was not meant to suggest the shale pit area was the only location on the Site where an on-site containment cell could be placed. In fact, a geotechnical evaluation was completed as part of the FS in an area in the northeastern portion of the Site. That geotechnical evaluation concluded that the northeastern portion of the Site was also suitable for construction of an on-site containment cell.

This evaluation report presents new and enhanced information regarding construction of an on-site containment cell to hold stabilized ash, soil and sediment collected during the remediation. As part of this evaluation both the area of the shale pit and the northeastern portion of the Site are considered as possible locations for an on-site containment cell. The approximate position of an on-site containment cell at these two locations is shown in Plates 1 and 2. These plates also include additional information which will be referred to in subsequent sections of this evaluation report.

The locations of the two on-site containment cells shown in Plates 1 and 2 were chosen to complete the "more focused" evaluation requested by USEPA and PADER. The two locations shown in these Plates are not meant to imply they are the only possible locations at the Site where an on-site containment cell can be constructed. The locations were simply chosen to assist in the "more focused" evaluation, particularly with respect to the PA Residual Waste Management Regulations, for an on-site containment cell in a specific location of the Site.

Also, the areal extent of the two proposed on-site containment cells shown in Plates 1 and 2 represent a maximum volume capacity design as described in the FS Report. Hence, the radial distances from the edges of these cells are from the maximum limits of the cell. The on-site containment cell which is subsequently designed will actually occupy a smaller area.

1.1 *PROPOSED PLAN SUMMARY*

The USEPA issued a proposed plan for the Site for public comment in April 1992. The proposed plan identified the preferred remedy as Remedial Alternative VI with modified or new common actions. As stated above, Remedial Alternative VI included construction of an on-site containment cell to hold stabilized ash, soil and sediment collected during the remediation.

The proposed plan concluded that Remedial Alternative VI, which included construction of an on-site containment cell, provided the best balance of tradeoffs among the various alternatives evaluated in the FS Report. This evaluation focused on seven of nine evaluation criteria set forth in the National Contingency Plan (NCP). These seven criteria are:

1) Overall Protection of Human Health and the Environment
2) Compliance with ARARs
3) Long-Term Effectiveness and Permanence
4) Reduction of Toxicity, Mobility and Volume
5) Short-Term Effectiveness
6) Implementability
7) Cost

The first two criteria, overall protection of human health and the environment and compliance with ARARs, are referred to as threshold criteria. Basically, any preferred alternative must meet these two criteria in order to be selected. The remaining five criteria are referred to as balancing criteria. These criteria are used to compare each alternative to the other to enable selection or recommendation of the one alternative which, on balance, is best suited for a site.

The proposed plan concluded that Remedial Alternative VI, which included construction of an on-site containment cell, met the threshold criteria. The document further pointed out that the elements in ash, soil and sediment could not be destroyed. Thus, according to the document, off-site disposal of stabilized materials did not provide a reduction in risk beyond that provided by the remedial alternative which included construction of an on-site containment cell. Off-site disposal simply transferred the residual risk to a new location.

In the case of ARARs, the USEPA stated that it believed the preferred alternative, which included construction of an on-site containment cell, will attain ARARs. However, the agency retained the option of issuing an Explanation of Significant Differences or ROD Amendment if, during remedial design or as part of a five year review, it is determined the preferred remedy does not meet ARARs.

The preferred alternative in the proposed plan also fared well in comparison of the balancing criteria. The proposed plan indicated that the remedial alternative which included construction of an on-site containment cell satisfied the statutory preference for treatment as a principal element and used permanent solutions and alternative treatment technologies to the maximum extent practicable. Finally, it was noted in the proposed plan that the preferred alternative was cost effective and provided the greatest degree of protection from risks for reasonable costs.

After the public comment period on the proposed plan, the USEPA weighs the two remaining evaluation criteria. These two criteria are:

8) State Acceptance
9) Community Acceptance

These final two criteria are referred to as modifying criteria. They are factored into the final balancing prior to the USEPA selecting a remedy. The incorporation of these two modifying criteria are discussed in the ROD.

1.2 RECORD OF DECISION (ROD) SUMMARY

The USEPA issued a ROD for the Site on September 30, 1992. The selected remedy in the ROD differed from the preferred remedy described in the proposed plan. Essentially, the selected remedy in the ROD consisted of the nine common actions in conjunction with Remedial Alternative V, which specified stabilization of ash, soil and sediment and subsequent removal to an off-site disposal facility.

However, as previously stated in section 1.0, the ROD provided for the option of modifying the selected remedial alternative. This modification would allow construction of an on-site containment cell pending a demonstration that such a cell is shown to be an equally or more protective remedy which is also cost effective and complies with all ARARs.

The ROD contains a section which documents significant differences between the preferred remedy in the proposed plan and the selected remedy. This section suggests that the USEPA evaluation of the two modifying criteria, state and community acceptance, were a factor in the decision to select a remedy that was different than the preferred remedy in the proposed plan.

In the case of state acceptance, the ROD indicates that the Commonwealth of Pennsylvania could not "...concur with the construction of an on-site containment cell until more information concerning the design of the on-Site containment cell is available to ensure compliance with Pennsylvania's residual waste management regulations, although no current information prevented the location of a containment cell at the Site."

In the case of community acceptance, the ROD simply states that, " The comment reviewed from the community in which the Site is located were strongly in favor of off-Site disposal of stabilized material".

As an apparent consequence of the USEPA evaluation of these two modifying criteria, the ROD selected off-site disposal of stabilized ash, soil and sediment. Simultaneously, the ROD set forth a 180 day time frame for a demonstration to support modifying the selected remedial alternative to allow construction of an on-site containment cell.

1.3 POST RECORD OF DECISION (ROD) ACTIVITIES

AT&T Nassau (Nassau) sent a letter to the USEPA, dated October 30, 1992, taking issue with the selected remedy in the ROD (see Attachment A). The position which Nassau took in the October 30, 1992 letter maintained that the ROD did not contain any new facts or data not known at the time the proposed plan was issued and, thus, did not substantiate any reasons for the USEPA's reversal of the preferred remedy in the proposed plan. Furthermore, Nassau stated that the information it believes is required to support selection of the remedy which allows construction of an on-site containment cell was already presented to USEPA in documents developed during the Remedial Investigation and Feasibility Study (RI/FS). Nevertheless, Nassau indicated a willingness to meet with the USEPA to clearly identify the type of information sought by the agency.

The PADER sent a letter to USEPA concerning the ROD which was dated December 23, 1992 (see Attachment A). In that letter, PADER took the position that the USEPA did not satisfy the requirements of the NCP. In summary, that position was based on the fact that "... the analysis of the alternative remedies proposed under the criteria set forth in CERCLA and the NCP, as documented in the Record of Decision, does not provide documented reasons to support the ultimate decision to select Alternative 5 [which includes off-site disposal]." Furthermore, the PADER letter states that "...the Documentation of Significant Differences section of the final ROD does not adequately explain why EPA chose Alternative 5 over Alternative 6."

The USEPA responded to the October 30, 1992 letter from Nassau via letter dated December 29, 1992 (see Attachment A). In that letter the agency expanded upon the basis behind its decision to select the remedial alternative which included off-site disposal of stabilized materials rather than the preferred remedy identified in the proposed plan which provided for construction of an on-site containment cell. Basically, the USEPA reiterated that the selected remedy in the ROD was based on careful consideration and comparative evaluation of the nine criteria set forth in the NCP.

The USEPA letter indicates that the "... lack of community acceptance of EPA's preferred remedial alternative and the Commonwealth of Pennsylvania's uncertain position on the adequacy of the information needed to support selection of an on-Site disposal alternative were balanced against the reasons supporting the preferred on-Site remedial alternative. " This balancing allegedly prompted the USEPA to change the its decision regarding the preferred remedial alternative in the proposed plan to the selected remedy in the ROD which stipulated off-site disposal.

The USEPA letter restates the fact that the agency has the option of modifying the ROD, under certain conditions, and selecting the alternative which includes construction of an on-site containment cell to hold stabilized ash, soil and sediment. The letter also states that the Administrative Record and ROD contain documents or language already indicative of the level of protection and cost effectiveness of the alternative which includes construction of an on-site disposal cell. Therefore, the issue of ARARs, specifically state ARARs, is the area which requires more elaboration.

Toward that end, the USEPA letter recommends further evaluation of certain sections of the Pennsylvania (PA) Residual Waste Management Regulations. The cited sections of the PA Residual Waste Management Regulations which the USEPA suggested a more focused evaluation were: § 287.127; § 287.132; § 287.134; § 288.112; § 288.113; § 288.121-127; § 288.412(a)(1); § 288.422; § 288.423; and, § 288.432.

The USEPA letter states that the intent of the focused evaluation <u>was not</u> to require a remedial design. Rather, the focused evaluation was intended to address each of the substantive issues raised in the aforementioned sections of the PA Residual Waste Management Regulations.

After receipt of the USEPA letter, Nassau responded in a letter dated January 15, 1993 by again taking the position that the information requested by the USEPA already existed on April 24, 1992 when the agency issued the proposed plan (see Attachment A). Additionally, one of the attachments to Nassau's letter included a 13 page "focused evaluation" of the sections of the PA Residual Waste Management Regulations cited in the USEPA letter. This attachment contained a brief description of the cited section followed by references to various documents developed during the RI/FS which contained the substantive information in question. Therefore, Nassau remained unclear as to what additional information the USEPA needed and requested a meeting with representatives of the agency.

A meeting was held between representatives of USEPA, PADER and Nassau on February 9, 1993. The purpose of the meeting was to identify which sections of the PA Residual Waste Management Regulations required a more "focused evaluation".

To facilitate this effort, Nassau gave a presentation on the technical rationale behind of construction of an on-site containment cell at the Site. There were two possible locations for the on-site containment cell discussed at the meeting. One location was the shale pit and the other was in the northeastern portion of the Site. The format of the presentation followed the outline of the PADER Residual Waste Landfill Permit Application Form D. This form is entitled, <u>Exclusionary Area Criteria/Environmental Assessment Process for Residual Waste Management Facilities</u>.

The basic technical information which supported Nassau's presentation was contained in various RI/FS documents. Therefore, following the presentation, Nassau offered to prepare a document which would expand the information in areas identified by both USEPA and PADER and develop a comprehensive package for this review.

USEPA and PADER representatives concurred with this approach and reiterated that document should address the sections of the PA Residual Waste Management Regulations previously mentioned in the December 29, 1992 letter from USEPA to Nassau. PADER representatives added one section of the Residual Waste Management Regulations to those previously mentioned. This was § 288.425 Basic Treatment Methods. Also, PADER agreed to supply Nassau with the Permit Application Forms for Residual Waste Management Facilities to assist it in preparing the comprehensive document.

1.4 *ORGANIZATION OF REPORT*

This evaluation report is comprised of five sections. These sections are intended to provide a project overview which has lead to this report and address each of the items covered in the ROD which USEPA indicates are necessary to modify the selected remedy to permit construction of an on-site containment cell.

Section 1.0 provides a summary of the recent project events which have lead to the preparation of this report. Section 2.0 addresses the question of whether the on-site containment cell will provide the same, or higher degree of protection of human health and the environment. Section 3.0 is an in-depth review of how the on-site containment cell complies with the substantive requirements of the PA Residual Waste Management Regulations (State ARARs). Section 4.0 compares the cost of the remedy which involves an on-site containment cell and the remedy which involves off-site disposal. Lastly, a summary and recommendation is provided in Section 5.0.

Section 2

2.0 *EVALUATION OF OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT*

The NCP requires selection of a remedy which provides protection of human health and the environment. As stated in section *1.1*, this evaluation measure is a threshold criteria which must be met by the selected remedy.

The USEPA has determined that the currently selected remedy, which involves off-site disposal of stabilized materials, meets this threshold criteria. Therefore, to assess whether the selected remedy should be modified to provide for the placement of stabilized materials in an on-site containment cell, a comparison of the degree to which these two options protect human health and the environment is necessary.

The RI/FS (Risk Assessment and Ecological Assessment Reports) defined the baseline risk posed to the Site under current conditions. The remedial alternatives which involved either off-site disposal of stabilized materials or placement in an on-site containment cell would eliminate or reduce, to acceptable levels, the human health and environmental risks related to Site conditions.

The RI/FS also determined that the primary risks posed by the Site are due to the potential for ingestion of lead in on-site and adjacent off-site surface soil. Therefore, the excavation and stabilization of ash and soil would significantly reduce the potential risks from exposure. Placement of the stabilized material in an on-site covered, containment unit would eliminate the potential for human exposure to soil and for the potential release to the environment of Site related chemicals in soil through wind or storm water erosion or leaching.

Additionally, the on-site disposal cell would be constructed with a cover and liner system designed in accordance with conventional technologies to provide long-term protection from waste materials. The use of these containment measures for stabilized materials serves as another set of protective measures in addition to stabilization. Since the cover and liner would be designed (minimum maintenance, storm water and erosion control, subsidence controls), constructed and maintained (thirty year period, groundwater monitoring, maintenance, restricted access) to meet current PA Residual Waste Management Regulations, it will function as intended and continue to provide protection against potential human health and environmental risks from ash, soil and sediment with little, if any, maintenance. The leak detection system included in the liner design and the groundwater monitoring program would provide a reliable method of monitoring the effectiveness of stabilization and on-site disposal of stabilized materials.

The containment measures provided by an on-site containment cell may likely be more protective of human health and the environment than those provided by off-site disposal. This is because the on-site containment cell would be designed and constructed to meet current PA Residual Waste Management Regulations with respect to liner and cover requirements. The liner would include impermeable primary (i.e., leachate collection) and secondary (i.e., leak detection) liner components. The cover would also include an impermeable synthetic membrane liner (e.g., 60 mil HDPE).

Existing off-site residual waste landfills which would accept the stabilized materials (after PADER approval) were not constructed under the new regulations. Also, since these existing off-site residual waste landfills are commercial facilities, the unit in which the stabilized materials will be placed may likely be open for an indeterminate amount of time. This would prolong the time the stabilized material is exposed to the elements, since only daily or intermediate cover would probably be applied. Although the probability of stabilized materials leaching constituents when exposed to the elements is remote, placement in a commercial facility will limit control of the waste once it is stabilized and leaves the Site.

The ROD characterized the placement of stabilized materials in an on-site containment cell or removal of these materials to an off-site disposal site as providing, "...the highest degree of protection of human health..." (see ROD page 55). With respect to the environment, the ROD indicated that three of the possible remedial alternatives, including the alternative which consist of construction of an on-site containment cell, "...significantly reduce or eliminate potential environmental impacts by preventing migration..." (see ROD page 56). In particular, the ROD states that the off-site disposal of stabilized materials "...does not provide a reduction in risk beyond that provided by Alternative 5 [which includes construction of an on-site containment cell], but rather transfers minimal risk to a new location..." (see ROD page 71 ¶ C). Therefore, the regulatory judgement is that the on-site containment cell is equally, or more, protective of human health and the environment as off-site disposal.

This regulatory judgement was reiterated in the December 29, 1992 letter from USEPA to AT&T. In that letter it states that, " Since the Administrative Record and the ROD contain documents or language already indicative of the level of protection and cost-effectiveness of the on-site disposal alternative, the issue of ARARs, and specifically State ARARs, requires more elaboration". This statement by USEPA is consistent with the ROD and the conclusion in the proposed plan which recommended the remedial alternative which included placing the material in an on-site containment cell.

In summary, the FS Report, proposed plan and descriptions in the ROD confirm that placing the stabilized materials in an on-site containment cell is equally, or more protective of human health and the environment as the remedy which specifies off-site disposal of stabilized materials.

Section 3

3.0 *EVALUATION OF COMPLIANCE WITH ARARs*

This section of the report elaborates on the NCP evaluation criteria which is intended to determine whether the components of a selected remedial alternative meets applicable Federal and State laws and regulations. This elaboration is premised upon the fact that CERCLA (§ 121[e]) exempts any response action conducted entirely on-site from having to obtain a Federal, State, or local permit, where the action is carried out in compliance with aforementioned CERCLA section § 121. Consequently, on-site actions need to comply with the substantive aspects of ARARs and not the administrative requirements. Compliance with these substantive aspects needs to be demonstrated in the FS Report, Proposed Plan and ROD.

As a threshold criteria, compliance with ARARs is essential to selection of a remedy. The remedial alternative involving construction of an on-site containment cell complies with all Federal ARARs. This is clearly stated on page 56 of the ROD. With respect to State ARARs, the only outstanding question concerns the degree to which the on-site containment cell complies with PA Residual Waste Management Regulations.

Therefore, the "focused evaluation" regarding compliance with ARARs that is presented in this section concentrates on the technical issues pertaining to the PA Residual Waste Management Regulations as they relate to the on-site containment cell. In particular, the "focused evaluation" addresses the sections of the PA Residual Waste Management Regulations previously cited by USEPA and PADER as requiring further elaboration.

3.1 *EVALUATION OF COMPLIANCE WITH SUBSTANTIVE ASPECTS OF PA RESIDUAL WASTE MANAGEMENT REGULATIONS*

The remaining portions of this section are devoted to a detailed analysis in accordance with those sections of the PA Residual Waste Management Regulations cited in section *1.3*. These sections of the PA Residual Waste Management Regulations were identified in correspondence from the USEPA, and at the meeting with representatives of USEPA and PADER, as the ones requiring a more "focused evaluation".

The following analysis briefly summarizes the requirements of each particular section of the PA Residual Waste Management Regulations. This summary of the requirements is followed by an evaluation. The evaluation presents the substantive aspects of the requested information. Additionally, although neither a Residual Waste Landfill Permit Application is being sought nor a Remedial Design prepared, the PADER Permit Application Forms which correspond to these sections are also addressed.

The sections of the Residual Waste Management Regulations which are being addressed in this report do not encompass all the PADER Permit Application Forms for residual waste management units. This is because the remaining forms deal entirely with design or administrative issues.

The evaluation presented in each of the following sections relies heavily on the information collected during the RI/FS. This existing information is assembled in appendices to facilitate review of this document. If further information on one of these appendices is needed, the appropriate RI/FS document can be accessed.

In addition to the compilation of information collected during the RI/FS, the evaluation also accessed some new information to address specific requirements in the various sections of the PA Residual Waste Management Regulations. The majority of the new information addresses questions regarding the Environmental Assessment (*§ 287.127*) and Areas Where Class I Residual Waste Landfills are Prohibited (*§ 288.422*). This new information is either referred to in the narrative or included in an appendix.

3.1.1 § 287.127 Environmental Assessment

This section describes the content of an environmental assessment for a proposed residual waste landfill. The items which the environmental assessment is expected to include are: potential impacts on the environment; public health and safety; traffic; aesthetics; air and water quality; stream flow; fish and wildlife; plants; aquatic habitat; threatened or endangered species; water uses; and, land use. In addition, items which the environmental assessment must consider are features such as recreational river corridors, State and Federal Forests and Parks, the Appalachian Trail, historic and archeological sites, national wildlife refuges, State natural lands, prime farmland, wetlands, special protection watersheds (designated under Chapter 93-relating to water quality standards) and public water supplies.

This section also indicates that if the proposed facility is a residual waste landfill, the social and economic benefits of the project to the public should be described. This description should explain the need for the facility and its consistency with regional solid waste plans approved by PADER.

3.1.1.1 Evaluation

The following evaluation address each one of the items referred to in this section of the PA Residual Waste Management Regulations. Specific information supporting the elements of the environmental assessment, much of which was already developed as part of the RI/FS, is identified and included as an appendix to this report.

Potential Impact on Environment, Public Health and Public Safety

The potential impact on environment and the public health and safety from the remedial alternative which includes construction of an on-site containment cell was discussed in portions of sections 4.9.2.1 Overall Protection of Human Health and the Environment, 4.9.2.3 Long-Term Effectiveness and Permanence and 4.9.2.6 Short-Term Effectiveness of the FS Report. These sections of the FS Report were previously discussed in section 2.0. The basic premise of the evaluation in the FS Report is that impacted media (ash, soil and sediment) must be remediated. And the subsequent placement of this remediated media in an on-site containment cell is protective of human health and environment. Consequently, the on-site containment cell will not adversely impact public health and public safety.

It has already been established that the potential risks to human health and the environment which are posed by the Site would be eliminated by: removing soil, sediment and ash; stabilizing the soil, sediment and ash to reduce the mobility of Site related chemicals; and, placing the stabilized soil, sediment and ash in a covered, central area on-site. Hence, the environment, public health and public safety would benefit from the remedial alternative which includes construction of an on-site containment cell.

Since these benefits would also be achieved with the removal of stabilized soil, sediment and ash (stabilized materials) for off-site disposal, it is necessary to consider both short-term effects as well as the long-term effectiveness and permanence of an on-site disposal cell. In the case of short-term effects, any of the remedial alternatives which result in requirements will function to provide protection against potential risks to the public and environment.

Hence, the existing information and prior regulatory judgment of this information (see section *2.0*), indicate that construction of an on-site containment cell would not adversely impact public health or safety.

<u>**Aesthetics and Potential Impacts Resulting from Traffic**</u>

The construction of an on-site containment cell at the Site should not have any negative impacts on aesthetics, primarily because the proposed facility will be open for a relativity short period of time (approximately 12 months). This evaluation report presents two possible locations at the Site where an on-site containment cell could be constructed. These locations are shown in Plate 1 and 2. Neither of these two possible locations would substantively alter the appearance of the immediate area. In fact, final construction of an on-site containment cell in the shale pit could arguably improve the aesthetics in this area of the Site.

The possible location of the on-site containment cell in the northeast portion of the Site would have a maximum final grade elevation of approximately, 1689 feet. The surface topography to the northeast of this location rises to an elevation of 1795 feet approximately 800 feet to the northeast. Therefore, although the final grade of an on-site containment cell in the northeastern portion of the Site would be higher than the existing Site land surface, the completed cell is expected to be compatible with the variable, natural topography in the area.

The other possible location is located in the west-central portion of the Site. There is an existing depression at this location resulting from previous shale mining. The construction of a containment cell at this location would fill the existing depression and the final cover would be contoured more closely to the original ground surface. This cover would be vegetated and landscaped in contrast to the bare rock surface currently at this location.

There will be a basic amount of traffic associated with the remedial action whether the stabilized materials are removed off-site for disposal or placed on-site in a containment cell. Moreover, removing the materials off-site for disposal would result in an increase in traffic from over 2,000 additional trucks than would be required to transport the stabilized material. Hence, construction of an on-site containment cell eliminates the likelihood of excess traffic, and possible accidents associated with off-site transportation.

Potential Impacts on Air, Water Quality and Stream Flow

The construction of an on-site containment cell at the Site will not pose any more of an impact on air quality than the planned excavation and stabilization activities which will occur even if the treated material is removed off-site for disposal. The additional excavation and/or regrading which will be required for construction of an on-site containment cell will not significantly add to the potential air releases which might occur during implementation of the entire remedy at the Site. These potential air releases are primarily generation of airborne soil particles during excavation and stabilization activities.

Also, the stabilized materials are the only residual waste which will be placed in the on-site containment cell. This material is not putrescible waste, so it will not result in the subsequent generation of landfill gas.

Finally, since the on-site containment cell will be open for the same length of time as it takes to implement the other remedial activities, once these activities are completed and the on-site containment cell is closed, no future air impacts are expected.

During implementation of the remedy surface water controls will have to be implemented. The specific situations which will require these controls, and the regulations which dictate how these controls are to be implemented are discussed in section 4.9 of the FS Report.

Surface water runoff during the construction of the on-site containment cell will pose less of a potential impact than the excavation and stabilization activities of the planned remedy. Hence, the planned surface water controls that will be implemented during the remedy will provide the necessary control needed during additional regrading or excavation activities associated with construction of an on-site containment cell.

As previously described, the on-site containment cell will be constructed with a leachate collection system and have controls which convey storm water around the cover. These measures will be subsidized by post remedy surface quality monitoring which is required even if the stabilized materials are removed off-site for disposal. Consequently, once the on-site containment cell is closed, which will occur within approximately 12 months, the potential for future impacts to surface water are extremely remote.

The significance of any potential impact to ground water from the construction of the on-site containment cell can be determined by evaluating the potential for the stabilized materials to leach contaminants if the materials have the opportunity to come into contact with water. The results of the RI, calculations in the Risk Assessment (RA) and evaluations in the FS did not support the establishment of remedial action objectives for groundwater at the Site. The multiple ground water sampling, both on-site and off-site, show that the Site has not impacted groundwater. Therefore, based on the data developed during the RI/FS placing the stabilized materials, in an on-site containment cell will not expected to adversely impact ground water.

The conclusion that ground water has not been impacted was supported, by the fact that a period of approximately 25 years has passed during which time recovery operations took place on the Site. During this period of time, ash, soil and sediment, containing elevated levels of Site related constituents, have been exposed to the elements. And the contaminants in this material have not leached out to cause an adverse impact to ground water. After these materials undergo stabilization, a process by which the Site related constituents will be further bound into a solid aggregate, they will be even less likely to leach.

Furthermore, the on-site containment cell will be constructed with a leachate collection system and have a liner and cover. The cover will be contoured and vegetated to prevent infiltration of precipitation which could come into contact with the stabilized materials. The liner will prevent any free liquids which may find a way into the cell, principally during the time stabilized materials are being placed in the open cell, from migrating to ground water. The leachate collection system, positioned on top of the liner, will ensure any free liquids which do accumulate in the cell are conveyed to a central area for appropriate disposal.

The construction of an on-site containment cell will also not impact stream flow in the area. Surface water runoff from the majority of the Site is conveyed to Mill Hopper Creek, a seasonal surface water body, which drains into the Pond south of the Site. The cover of the on-site containment cell will be contoured to divert storm water flows around the cap. An example of these diversion channels was presented in Figure 4-8 of the FS Report for an on-site containment cell in the location of the shale pit. These diversions will control storm water runoff for eventual discharge to Mill Hopper Creek. Similar storm water diversion channels would be incorporated into a design of an on-site containment cell in the north eastern portion of the Site.

In summary, based on existing information the on-site containment cell should not have any impacts on air or water quality or increase stream flow at the Site.

Potential Impacts to Terrestrial and Aquatic Flora and Fauna

As part of the RI/FS an Ecological Risk Assessment (ERA) was done at the Site. This ERA characterized the environmental setting at the Site from the standpoint of terrestrial and aquatic flora and fauna. Although the main objective of the ERA was to determine if the conditions at the Site had measurable ecologic impacts, the data from the this report applies to an assessment of the potential for the on-site containment cell to pose ecologic impacts.

Figures and tables which summarized the results of the terrestrial and aquatic surveys conducted during the ERA are contained in Appendix 1. This information includes three figures which show the: 1) locations of the terrestrial flora and fauna sampling survey transects; 2) aquatic sample locations; and, 3) distribution of terrestrial flora. Also, there are three tables in Appendix 1 which show the percent cover of various vegetative species and summarize the various floral and faunal species which were observed at the Site.

The terrestrial flora within the fenced portion of the Site is dominated by species typically found in highly disturbed areas. Some areas are barren of vegetation, likely as a result of previous on-site remedial activities. Thin soil layers in this area also contribute to the lack of vegetation.

The only aquatic flora at the Site is associated with Mill Hopper Creek and the Pond located south of the Site. Since Mill Hopper Creek is seasonal, there was no aquatic flora measured during the ERA. In any case, the creek channel upgradient of the Pond is very rocky, thereby preventing floral species from establishing themselves. In the Pond, located south of the Site, sampling of aquatic flora was done and no macrophytes were observed. There were, however, phytoplankton and diatom species observed in the Pond.

The terrestrial faunal species observed at the Site were typical of those which prefer an open meadow habitat. These included species of mammals, avian and herptiles. The aquatic fauna was limited to primarily microinvertebrates (zooplankton) and some macroinvertabrate species (midge larvae, oligocaete worms, biting midge larvae and the predacious diving beetle). Also, several larval stages of insects were also found in the sediment of the Pond.

Although the field work which was done for the ERA included numerous seining attempts to capture any resident fish, there were no fish observed at any stage of growth. This is not surprising since the Pond is man-made and would require the introduction of fish unless species were able to migrate upstream to this habitat. The potential for fish to migrate upstream is extremely remote since there are numerous rock ledges throughout the creek bed which would impede migration.

The survey conducted during the ERA also involved contacting Federal And State agencies regarding the potential for threatened or endangered species in the project area. The field survey and subsequent inquiry, as reported in the ERA, indicted that no such species were present at the Site. As part of this evaluation, a number of questions relevant to the Residual Waste Management Regulations were posed to the PADER Forest Advisory Services. A letter received from this department indicates that White Haven Quadrangle, where the Site is located, was compared to the Pennsylvania National Diversity Inventory (PNDI) information system and no record of resources of special concern was found. A copy of this letter, which corroborates the ERA, is enclosed in Appendix 1A.

The planned remedial activities for the Site are intended to improve the ecological environment. Hence, the construction of an on-site containment cell, as part of the remedy, will not have any impact on the environmental habitats. After stabilized materials are placed in the on-site containment cell and the unit is closed, there are no future expected ecologic impacts. In fact, the vegetative layers placed over the cover of the cell will result in more lush terrestrial vegetation than currently present on the Site. A complete evaluation of the terrestrial and aquatic flora and fauna is contained in sections 2.2, 3.4 and 7.2 of the ERA.

Potential Impacts on Water and Land Use

The water supply in the immediate vicinity of the Site is ground water which is obtained from private wells. Generally, each residential home has its own well which extracts potable water from the bedrock aquifer. A trailer park (Maple Lane) and residential community (Hickory Hills) located north and northeast of the Site respectively, supply ground water to residents from private wells.

The trailer park, which is approximately one-quarter mile from the Site, is within the Pond Creek Drainage Basin (the Site is in the Sandy Run Drainage Basin). The majority, if not all, of the Hickory Hills property, which is adjacent to the Site, is also in the Pond Creek Drainage System (see Figure 2-2 of the RI Report). The supply wells at the trailer park and Hickory Hills may constitute a public water supply, depending on the number of users.

The public water supplies nearest the Site are operated by the White Haven Water Company, White Haven Water Authority, Freeland Water Authority and Sandy Run Water Authority. None of these purveyors of water have wells or surface water supplies within one-quarter mile of the Site.

Based on the available data, no adverse impacts to ground water are expected from the two possible locations for construction of an on-site containment cell. This conclusion is based on the fact that the existing conditions at the Site, which are characterized by ash, soil and sediment contaminated with lead, copper, and other constituents, have not resulted in any impact to ground water (see section 3.1.1.1 Evaluation, *Potential Impacts on Air Water Quality and Stream Flow).*

The Site property is currently zoned C-1, Conservation District. This zoning is intended to protect areas which have environmentally sensitive characteristics from inappropriate or untimely development. An example of an area which would be covered by this zoning is "land whose soils composition have been classified as toxic or hazardous by government agency of proper jurisdiction". Based on the current Foster Township zoning ordinance, some of the permitted uses of land zoned C-1 include agriculture and single family dwellings.

A Declaration of Restrictions has been placed on the deed. This deed restriction further limits the future use of the property beyond those restrictions placed on the Site by C-1 zoning. Specifically, the deed restriction establishes that no existing building will be used for any residential purpose and that no future property improvements will be made for any residential purpose. Further property restrictions apply to recreational, camping and agricultural uses. The deed restriction is intended to run with the property and remain in effect for a period of 99 years. The only potential for amending the declaration is by adding consistent restrictions or modifying existing ones to further restrict the property.

The combined impact of the restrictions imposed by C-1 zoning and the deed restrictions effectively eliminate most future uses of the property. Under C-1 zoning, most industrial uses would not be permitted while the deed restriction prevents other types of future uses which could result in exposures. The construction of an on-site containment cell at this Site is consistent with these restrictions.

In summary, the existing data supports the conclusion that the placement of stabilized materials in an on-site containment cell, at either of the two proposed locations, will not adversely impact ground water. Furthermore, the construction of an on-site containment cell at the Site is consistent with the land use restrictions that are in place.

Recreational River Corridors

The Pennsylvania Scenic Rivers Act classifies rivers as "Approved", "IA" or "IB". Approved rivers are designated scenic rivers while class IA and IB rivers are next in priority order for a scenic designation. The Lehigh River at the border of Luzerne County and Carbon County is an Approved Scenic River. This location is over three miles east of the Site. According to Terry Hoke (Environmental Planner, PADER Scenic Rivers Program) there are no rivers designated class IA in Luzerne County.

State and Federal Forests and Parks and Appalachian Trail

The nearest State-owned park lands are located northwest and east-northeast of the Site. The State-owned park land to the northwest lies along Nescopeck Creek, north of Interstate Route 80. The second State-owned park land is Hickory Run State Park which is adjacent to the northeast extension of the Pennsylvania Turnpike. Both these State-owned park lands are in excess of three miles from the Site. There are no Federally-owned park lands which are closer to the Site than the aforementioned State-owned lands.

The nearest State-owned forest lands are located northwest, northeast and east-northeast of the Site. The State-owned forest land to the northwest also lies along Nescopeck Creek, north of Interstate Route 80. These forest lands extend slightly south of Interstate Route 80 and are also designated State Game Lands # 187. The State-owned forest land located northeast of the Site is the Lehigh River. A second State-owned forest land comprises the western border of Hickory Run State Park, extending to the Lehigh River, and is also designated State Game Lands # 149. These State-owned park lands are in excess of three miles from the Site. There are no Federally-owned forest lands which are closer to the Site than the aforementioned State-owned lands.

The course of the Appalachian Trail is over 15 miles south of the Site. A portion of the Pennsylvania Recreational Guide and Pennsylvania Trail Guide showing the approximate locations of the park and forest lands and the Appalachian Trail is provided in Appendix 1B.

Historic and Archeological Sites

As part of the RI/FS a Phase 1A Archeological Survey of the Site was completed. This survey found that several prehistoric sites are recorded in the Lehigh River Valley approximately 10 miles east of Foster Township. The survey also found that there are no properties listed in the National Register of Historic Places within one mile of the Site. The closest property listed in the National Register is the Eckley Miners' Village which is in excess of two miles from the Site. The Phase 1A report recommended a Phase 1B survey to: 1) further assess whether prehistoric archeological resources are located in the vicinity of Mill Hopper Creek; and, 2) evaluate potential historic archeological resources possibly associated with a nineteenth century farm complex which is part of the Site. A Phase 1B survey was specified in the ROD and will be completed prior to undertaking the selected remedy.

Additional information is provided in the RI/FS Report entitled, A Phase 1A Archeological Survey of the C&D Recycling Property, Foster Township, Luzerne County, Pennsylvania.

National Wildlife Refuges and Prime Farmland

According to the U. S. Fish and Wildlife Service, Department of Public Affairs in Washington, D.C., there are no National Wildlife Refuges, National Fish Hatcheries or National Environmental Centers in the vicinity of the Site. In fact, none of these facilities are located in Luzerne County or the adjacent Carbon County.

According to the U.S Department of Agriculture Soil Conservation Service, the soil type in the northwestern portion of the Site is characterized as cut and fill material. This designation applies to areas which have had the original soil profile destroyed as a result of regrading or construction (eg. buildings and parking areas). The soil cover in the remaining portions of the Site are characterized as the Oquaga and Lordstown Series, specifically, the Oquaga and Lordstown channery silt loams. The soil survey report indicates that these soil types are not suited to cultivating crops in places where rock outcrops are common. Since rock outcrops exists in numerous areas of the Site, the soil would not be representative of prime farmland. Copies of the relevant portions of the soil survey report for Luzerne County are contained in Appendix 1C.

Wetlands

A review of the Soil Survey for Luzerne County does not identify any soil types in the project area which are typically associated with the presence of wetlands. Additionally, the National Wetlands Inventory Map indicates that a small wetland classified as "POWFh" (Palustrine, Open Water (bottom unknown), Semipermanent, Diked/Impoundment) exists south of the Site.

This area is the Pond which Mill Hopper Creek drains into. The portion of the National Wetlands Inventory Map is provided in Appendix 1D.

The ERA report, which was completed as part of the RI/FS, addressed the issue of wetlands at the Site. The ERA report concluded that, according to the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, limited areas adjacent to the portion of Mill Hopper Creek can be characterized as wetlands. These wetlands are narrow, extending approximately 0.5 to 1.0 feet on either side of the creek.

Similarly, a narrow band of wetlands was determined to be present around the Pond, located south of the Site. These wetlands widen and encompass a larger area in portion of Mill Hopper Creek downstream of the Pond.

The ERA Report noted that the limited wetlands on the Site which were associated with the edges of Mill Hopper Creek were not observed to contain any special environments.

There was an expanded wetlands survey conducted at the Site after the ERA Report was completed. This subsequent assessment was intended to more specifically address the area in the eastern portion of the shale pit. Since the FS Report had presented its detailed evaluation of an on-site containment cell in this area of the Site, both the USEPA and PADER requested further characterization in this area, particularly in the vicinity of an existing artesian well.

The expanded wetlands survey was completed on March 12, 1992. This survey concluded that there was no evidence of jurisdictional wetlands as defined by the characteristics of hydric soils, hydrophytic vegetation or hydrology. However, because of the extreme surface water flow and saturated nature of the area, a flat depressional area in the vicinity of the artesian well could be considered the headwaters of Mill Hopper Creek and, by extension, possibly classified as open waters of the US. Therefore, the saturated, flat depressional area around the artesian well was staked for future planning stages. A copy of the letter sent to the USEPA regarding this expanded wetlands survey is provided in Appendix 1D. The approximate area of the headwater of Mill Hopper Creek is indicated in Plate 2.

Special Protection Watersheds

Special Protection Watersheds are designated in Chapter 93 of the PADER Rules and Regulations. These regulations indicate the Sandy Run Drainage Basin is a designated, a High Quality Cold-Water Fishery. This is the second highest priority designation in the aforementioned regulations. Since the entire basin is assigned this designation, it can be extended to the surface water bodies which drain into Sandy Run. This includes the creek which drains the Site.

It should be noted that the portion of Mill Hopper Creek which drains the Site does not sustain a continued surface water flow throughout the year. Mill Hopper Creek becomes perennial only in the area south of the Pond. Furthermore, the Sandy Run Drainage basin is within the Central Delaware River Subbasin (designated Subbasin 2 in the 1992 Water Quality Assessment of the Commonwealth of Pennsylvania 305(b) Report). A major source of degradation in this subbasin is resource extraction (principally coal mining) that has taken place in the upper Lehigh River and along its tributaries. In fact, acid mine abatement methods have been implemented in a number of areas within this subbasin. An acid mine drainage treatment plant is operating in Sandy Run Creek at Foster Township, Luzerne County.

Social and Economic Benefits

As indicated in the ROD, the community was not in favor of placing the stabilized materials in an on-site containment cell. The public comments advocated removing this material off-site for disposal. In the RI/FS process, these comments are weighed as modifying criteria when selecting a final remedial alternative for the Site.

Nevertheless, the Site remediation will have both social and economic benefits to the community. These benefits will arise from the reduction and/or elimination of potential future risks attributed to conditions at the Site if the environmental problems were not abated. Consequently, conditions at the Site will improve after the remedy, even if the stabilized materials are placed in an on-site containment cell.

3.1.2 § 287.132 Chemical Analysis of Waste

This section describes the requirements for the chemical analysis of waste material to be disposed in a residual waste landfill. The key technical requirements are as follows:

1. A detailed analysis to fully characterize the physical and chemical composition of the waste.

2. An evaluation of the ability of the waste to leach into the environment.

3. A determination of whether the waste is hazardous.

4. A determination that the waste meets the requirements for disposal in a residual waste facility.

5. A waste sampling plan, including a quality control and quality assurance plan.

6. A description of the waste generation process.

Other requirements are administrative in nature or do not apply to work related to the on-site disposal remedy (i.e., requirements for waivers or modifications).

3.1.2.1 *Evaluation*

The following evaluation addresses each of the items referred to in this section of the regulations. Specific information supporting this evaluation, much of which was already developed as part of the RI/FS, is identified and included an appendix to this report.

Waste Characterization

The regulations require that a detailed analysis that fully characterizes the physical properties and chemical components of the waste be provided. The waste to be placed in the on-site containment cell proposed in Remedial Alternative VI consists of the following stabilized materials:

1. On-site and off-site soil containing lead in concentrations above 500 ppm;
2. On-site ash; and
3. Pond and sewer system sediment.

Remedial Alternative VI includes the excavation, treatment by stabilization and placement in the on-site containment cell of approximately 28,400 cubic yards of stabilized material. The material to be placed in the on-site containment cell, then, is soil, ash and sediment after it is stabilized.

Information on physical properties and chemical composition of stabilized material, discussed below, was presented in the RI and the Stabilization Treatability Study (included as Appendix A in the FS). The RI information characterizes the soil, ash and sediment that is to be stabilized. The Stabilization Treatability Study characterizes stabilized soil and ash, i.e., soil and ash treated by stabilization.

The importance of the RI information is that it describes the chemical composition of the soil, ash and sediment to be stabilized and placed in the on-site containment cell. Stabilization will, however, result in some changes in the physical properties and the chemical composition of these materials. Lead is the only indicator chemical for which the ROD established a remediation level (i.e., 500 ppm). Since lead is an inorganic constituent that cannot be altered or destroyed, the effects of stabilization on the chemical composition of soil, ash and sediment can be predicted. That is, the concentration of lead and other inorganic constituents in stabilized material will decrease in proportion to the amount of stabilized material, such as portland cement, added to soil, ash and sediment. The Stabilization Treatability Study demonstrated that a relatively small amount of stabilization material (i.e., approximately ten percent of portland cement) will effectively treat soil, ash and sediment. The addition of approximately ten percent of stabilization material will decrease lead concentrations by approximately nine percent but would reduce leachate (i.e., TCLP) concentrations substantially. Lead concentrations in leachate decreased as follows:

- in stabilized soil by over 99 percent from 221.0 mg/l (Table 2, Stabilization Treatability Study) to 1.75 mg/l (Table 19, Stabilization Treatability Study); and

- in stabilized ash by over 99.9 percent from 458 mg/l (Table 2, Stabilization Treatability Study) to 0.3 mg/l (Table 19, Stabilization Treatability Study).

The chemical composition of the stabilized materials, defined in terms of the concentration of organic compounds and inorganic constituents, will be similar, although slightly lower, than that of the existing (i.e, before stabilization) soil, ash and sediment. As a result, the chemical composition of soil, ash and sediment presented in the RI adequately describes the chemical composition of the stabilized material to be placed in the on-site containment cell. The RI characterized on-site and off-site soil, ash and pond sediment. Sewer system sediment was not characterized during the RI, but samples of this material collected from drains near the former operations area indicate these materials to contain levels of site related constituents similar to those found in ash and sediment. In any case, as described in Section 3.1.4 (Facility Plan, Weight or Volume of Waste), the 25 cubic yards of sewer system sediment represents less than one percent of the estimated 28,400 cubic yards of material to be stabilized. A summary of the RI soil, ash and sediment information is provided below and in Appendix 2.

The soils investigations conducted as part of the RI resulted in a comprehensive areal characterization of inorganic constituents both on-site and off-site. Furthermore, additional physical and laboratory information has permitted an assessment regarding the vertical extent of these inorganic constituents. Analyses of particular soil samples for targeted organic compounds also provides information regarding the distribution of these compounds which are possibly related to on-site sources. The results of the RI indicate soils to be the environmental medium most significantly impacted from past and current conditions at the Site.

The RI data describes the chemical composition of on-site and off-site soil. As prescribed in the ROD, soil containing lead in concentrations above 500 ppm is to be stabilized and placed in the on-site containment cell. The RI soil data is presented on the tables included in this report as Appendix 2A. Analytical results from a soil sample analyzed as part of the Stabilization Treatability Study were presented on Table 2 of the Stabilization Treatability Study. A copy of this table has also been included in Appendix 2A. The location of the on-site RI soil samples was presented in RI Figure 3-12 and the location of the off-site RI soil samples was presented in RI Figure 3-13. These figures have also been included in Appendix 2A. This data was used in the RI to develop Site plans showing the areal distribution of copper, lead, antimony, silver and zinc in surface soil. These RI figures (i.e., Figures 4-1, 4-2, 4-5, 4-6 and 4-7) are included in this report as Appendix 2B. Organic compounds, primarily PAHs, were detected less frequently than were inorganic constituents and at significantly lower concentrations. The distribution of organic compounds in surface soil was presented as RI Figure 4-8, included in Appendix 2B of this report. RI Figures 4-3 and 4-4, also included in Appendix 2B, show the concentration of lead and copper in subsurface soil (i.e., greater than two feet in depth). Based on the soil data developed during the RI, copper and lead occupy the largest area and hence, serve as the best indicators of the areal extent of environmental impact to soil.

Physical properties of soil are described in Section 3.1.9 of this report. Physical properties of Site soil were also reported in Appendix E of the FS, Geotechnical Report. The following physical parameters were defined for soil (referred to as "native soil"):

Dry unit weight: 115 pounds per cubic foot
Saturated unit weight: 130 pounds per cubic foot
Cohesion: 300 pounds per square foot

A total of 165 cubic yards of ash is present in five areas at the Site. Additional ash quantity and location information is presented in Section 3.1.4 (Facility Plan, Weight or Volume of Waste). The ROD calls for the excavation and stabilization of all ash located at the Site. Remedial Alternative VI proposes placement of this stabilized ash in the on-site containment cell.

A composite sample of ash was collected during the RI for analysis of EP toxicity metals plus copper, zinc, total cyanide and total phenols. A second composite ash sample was collected at two separate times in July and November 1989. These composite ash samples were analyzed for dioxin and furans and the results were reported in an addendum to the preliminary RI report, prepared by Fred C. Hart Associates, Inc. (Hart) entitled, Dioxin/Furan Analysis of Ash dated April, 1990.

Additional samples of ash were also collected in July and December 1990 and April 1991. The ash samples were subject to the TCLP test to determine whether the material was hazardous. The ash sample obtained in December 1990 also was analyzed for target compound list (TCL) and target analyte list (TAL) organic compound and inorganic constituents, respectively. The results of the composite ash sample collected in November, 1988 for EP Toxicity analysis and additional parameters were reported in RI Table 3-2, included in this report as Appendix 2C. The valid ash sample results for TCL/TAL and TCLP analysis were reported on Table 1-1 of the FS. This table has been included in this report in Appendix 2C. An additional ash sample was analyzed as part of the Stabilization Treatability Study. The results, summarized in Table 3 of the Stabilization Treatability Study, are included in this report as Appendix 2C.

The ROD prescribed excavation and stabilization of sediment from the banks of Mill Hopper Pond and within Mill Hopper Creek with lead concentrations greater than 500 ppm and excavation and stabilization of the top two feet of sediment from the Pond bottom. Remedial Alternative VI calls for stabilized pond sediment to be placed in the on-site containment cell. This would include stabilized sediment from Mill Hopper Creek. Sediment samples were collected in 1988 and 1989 from the main drainage channel into the Pond, the Pond itself, in Mill Hopper Creek downstream from the Pond, and in the drainage swales west of Brickyard Road. These samples were subjected to laboratory analysis of organic compounds and inorganic constituents to determine the extent to which these components have been carried away from the Site via surface water. In addition to chemical analyses, three samples were also submitted for grain size analysis.

The percent moisture and grain size analysis performed on pond sediment provided information on the physical properties of Pond sediment. This information was presented on Tables 3-7 through 3-9 of the RI, included in this report in Appendix 2D. Typically, sediment grain size is directly correlated with the velocity of the surface water at each sample collection point. Based on the grain size analyses, surface water flow north of the Pond is turbulent and fairly rapid. Seventy-eight percent of the stream sediment collected in this area was composed of medium to fine sand while soil particles smaller than fine sand remain in suspension due to the stream velocity and migrate toward the Pond. The sediment sample from the Pond was composed almost entirely of silt and clay particles. The presence of these smaller sediment particles is caused by the very low velocity of water through the Pond. The reduced velocity and areas of laminar flow in portions of the Pond allows nearly all of the suspended material from the incoming water to settle out of the water column. South of the Pond, stream velocity again increases because of both channelized flow and increased stream gradient. This is reflected by the presence of medium to coarse sand in the sediment south of the Pond which is derived locally since nearly all of the upstream sediment load has been deposited in the Pond.

The sediment samples were obtained from locations and intended to allow comparison of upstream, Pond and downstream sediment quality, evaluate variations of sediment quality within the Pond and characterize sediment in drainage swales adjacent to Brickyard Road, west of the Site. The result of the sediment sampling indicates that the Pond has trapped the majority of sediment eroded from the Site thereby limiting the migration of organic compounds and/or inorganic constituents associated with the Site to within 600 feet south of the Pond. This was shown in Figure 4-9 of the RI, included in this report in Appendix 2D. The highest levels of lead and copper, the most predominant Site related constituents identified in sediment samples, were found in the Pond and just downstream of the pond at distances of 50 and 250 feet.

The sediment data collected during the RI exhibits a direct correlation between sediment size and concentration of inorganic constituents, particularly metals. This is because smaller silt and clay size particles tend to be slightly polar, electrochemically and therefore, tend to attract metals. The smaller the sediment size the greater the concentrations of metals absorbed onto the sediment.

__Waste Leachability__

The regulations require that the ability of the waste and the constituents in the waste to leach into the environment be evaluated. The waste to be evaluated is the stabilized material which Remedial Alternative VI called for placement in the on-site containment cell. The principal focus of the Stabilization Treatability Study was to evaluate the leachate characteristics of stabilized material. A summary of the testing performed and the assessment of leachate characteristics is provided below.

A sample of ash and soil was provided for the stabilization treatability study. The untreated samples were analyzed for total and TCLP metals, semi-volatiles and various physical properties. Initially a seven and fourteen day stabilization study was conducted using various quantities of Type I portland cement, pozzaline, cement kiln dust and lime kiln dust. In addition, three proprietary agents developed by International Waste Technology (IWT) were tested.

The initial stabilization study involved two series of tests. The first tests were to determine the physical strength of the stabilized material and relied on a pocket penetrometer. Each mixture was tested after cure times of 3,5,6,7 and 10 days. These first tests indicated that all but one mixture (10 percent lime kiln dust for soil) met or surpassed a pre-established physical strength of 4.5 tons/ft^2 (62.5 psi). Depending on the agent which was added to the material, the volume of the stabilized samples remained essentially unchanged or increased by as much as 24 percent.

The second series of samples involved evaluation of the leachate of each mixture using TCLP analysis. Each mixture was subject to TCLP testing after seven and fourteen days. The relatively high leachate concentrations of lead and copper in these mixtures were attributed to the presence of large rocks and particles in the untreated soil and ash. Since the stabilization agents can only adhere to the surface of rocks, when the molds are broken for subsequent TCLP testing, the agent falls away from the rock surface. The TCLP solution essentially washes the rock surface resulting in high leachate values. The lower leachate values associated with the IWT mixtures were attributed to a greater capacity for these agents to adhere to the rocks.

An additional stabilization study was conducted on separate samples of rock and ash. This phase of testing incorporated procedural modifications based on the results of the previous studies. These procedural modifications involved separating the rocks from the soil and crushing the rocks. Additionally, the ash and soil were crushed. The untreated rocks, soil and ash underwent TCLP testing for lead and copper. Based on the TCLP results, it was determined that the higher concentrations of lead and copper in the leachate of the untreated rock, soil and ash samples were not influenced by the size of the particles. Following crushing, mixtures using various percentages of Portland cement and cement kiln dust were prepared for crushed rock, crushed soil and rock and crushed ash.

The mixtures were subject to TCLP analysis after seven days. The indicator chemicals lead and copper were used to assess effectiveness. The TCLP results indicate that when Portland cement is used, crushing and/or separating results in concentrations of copper and lead in leachate at levels below 0.5 ppm, an order of magnitude lower than the TCLP regulatory limit for lead of 0.5 ppm. There is no TCLP regulatory limit for copper.

The final stabilization testing used Type I Portland cement as mixing agent for separate samples of crushed ash and crushed soil (including crushed rocks). The results of the final phase of the testing indicate that separating and crushing the rocks and crushing the ash and soil prior to adding 10 percent Type I Portland Cement will sufficiently stabilize the materials so that leachate concentrations via TCLP analysis are below regulatory limits. The TCLP results were presented in the Stabilization Treatability Study in Table 19 (TCLP metals) and Table 20 (TCLP semi-volatiles) for crushed ash and soil samples. All of the TCLP parameters in the leachate from the stabilized ash and soil were below the TCLP regulatory limit. The stabilization treatability study also determined that use of proprietary agents developed by IWT, although costly, could adequately stabilize the material without separation or crushing.

The overall effectiveness of stabilization has been shown through treatability studies. The treatment of affected materials in this manner, in conjunction with the placement of the stabilized material in the on-site containment cell proposed in Remedial Alternative VI, would virtually eliminate the ability of the waste and constituents in the waste to leach into the environment. Additional pre-design studies, described in Section 4.9.1 (d) of the FS would evaluate stabilization of pond and sewer sediments and the possible use of other stabilization agents to identify improvements in performance. Section 4.9.1 (d) of the FS also stated that Remedial Alternative VI would include performance sampling of stabilized materials to be analyzed prior to placement in the on-site containment cell. Additional information on performance sampling to ensure that waste and waste constituents do not leach into the environment (i.e., leachate concentrations ares below TCLP regulatory limits) is described in the Waste Analysis Plan, Section 3.1.3 of this report.

Hazardous Waste Determination

The FS concluded in Section 4.3.1 (pond sediment), Section 4.3.2 (sewer system sediment) and in Section 4.8.1 (soil and ash) that soil, ash and sediment are not a RCRA listed waste. That is they are not: (1) wastes from specific sources (F wastes listed in 40 CFR 261.31) or from non-specific sources (K wastes listed in 40 CFR 261.2); or (2) wastes from discarded commercial chemical products and associated spill residues (P and U waste listed in 40 CFR 261.33).

EP Toxicity and TCLP tests described in the Stabilization Treatability Study for soil and ash (Tables 2 and 3, respectively, included in appendix 2A and 2C of this report) indicated that levels of lead in the leachate exceeded the TCLP regulatory level of 5 mg/l. Thus, soil and ash are RCRA hazardous wastes (USEPA hazardous waste number D008) because the leachate from this material exhibits the characteristic of toxicity. It was assumed in the FS that pond and sewer sediment leachate would also exceed TCLP regulatory limits and, as a consequence, would also be classified as a RCRA hazardous waste (USEPA hazardous waste number D008) because it exhibits the characteristics of toxicity.

Remedial Alternative VI calls for this material to be treated with stabilization to reduce the concentration of chemicals in leachate to below TCLP regulatory limits before it is placed in the on-site containment cell. As a result, the stabilized material will not be classified as a RCRA hazardous waste.

The USEPA has concluded that the soil, ash and sediment at the Site are RCRA characteristic and not listed hazardous waste. In the Responsiveness Summary (Appendix A to the ROD, page 42), the USEPA stated that: (1) once the soil and sediment is stabilized, the hazardous characteristic is removed and the waste is no longer hazardous pursuant to RCRA (response to PADER comment No. 10); and (2) USEPA has determined that the ash is not a listed RCRA hazardous waste (response to PADER comment No. 11). It can be concluded that since ash is not a RCRA listed hazardous waste but is a characteristic (toxicity) hazardous waste, it will also cease to be a hazardous waste after it is stabilized.

<u>Residual Waste Disposal Requirements</u>

The regulations require that the waste meet the requirements for disposal at a residual waste landfill. The requirements for waste to be disposed at a residual waste landfill are defined in § 288.423, Minimum Requirements for Acceptable Waste, discussed in this report in Section 3.1.5. These requirements address issues such as compatibility with liner materials, compatibility with other waste, leachate treatment, and liquid content. The regulation also prohibits the disposal of municipal, hazardous and TSCA waste in a residual landfill.

The stabilized material to be placed in the on-site containment cell will have similar physical properties and chemical composition. Potential waste and liner incompatibility is less of a concern for the on-site containment cell where materials with similar properties are placed than for off-site commercial residual waste landfills where the properties of the waste placed can be expected to vary daily. In addition, the on-site containment cell is to only receive stabilized Site material and would, by definition, comply with prohibitions in this section of the regulations concerning municipal, hazardous and TSCA waste. These issues are discussed in more detail in Section 3.1.15 of this report.

Waste Sampling Plan

The regulations require that waste to be placed in a residual waste landfill be sampled. This section of the regulations (i.e., § 287.132) requires that a waste analysis plan, including quality assurance and quality control procedures, be prepared. A waste analysis plan is discussed in Section 3.1.3 of this report. Essentially, the plan will use leachate tests to evaluate the effectiveness of the proposed stabilization treatment. Section 3.1.9.2 of the FS states that the blending of the ash, soil and sediment could be accomplished on-site using a pug mill or similar equipment. Once the material is stabilized and has had ample time to cure, representative samples will be subject to EP Toxicity or TCLP testing of indicator chemicals to ensure compliance with regulatory limits. If one or more batch mixes do not pass the EP toxicity or TCLP test, the material will be put through the stabilization process a second time.

Section 4.9.1 (d) of the FS also states that the performance criteria to be used to determine the success of stabilization in treating lead in soil, sediment and ash would either be the Extraction Procedure Toxicity (EP Tox) test or the TCLP analysis. The USEPA has stated in the Third Third Land Disposal Restriction rule, 55 Federal Register 22567, June 1, 1990, and clarified in the Third Third Land Disposal Restriction correction notice, 55 Federal Register 3869, January 31, 1991 that specifically for arsenic and lead, the EP Tox test could be used in place of the TCLP test to demonstrate that arsenic and lead meet the Land Disposal Restriction treatment standards. Both methods would be evaluated during final design to determine which approach is most representative of Site conditions.

Waste Generation Process

This section requires that the waste generation process be described, including a description of the following:

- raw materials;
- primary chemical reactions;
- the sequence of events in the process;
- waste generation points;
- manner in which the waste is managed; and
- a schematic diagram.

The waste generation process, then, consists of the on-site stabilization process proposed in both Remedial Alternative V (off-site disposal), selected in the ROD, and in Remedial Alternative VI (on-site containment cell). The only waste which Remedial Alternative VI stipulates be placed in the on-site containment cell is the stabilized soil, ash and sediment. These are the raw materials of the waste generation process. These materials have been fully characterized in the RI, as described earlier in this section (Waste Characterization).

The primary chemical reactions are those occurring during the stabilization process. These will vary according to the stabilization agents used. Section 4.9.1 (d) of the FS explained that although the Stabilization Treatability Study evaluated a number of stabilization agents and demonstrated the feasibility of portland cement and a proprietary agent from IWT, a more extensive evaluation of other stabilization agents will be performed during design. This evaluation will be performed in order to identify potential cost savings and improvements in performance.

Although other stabilization agents may be selected during final design, portland cement and the IWT agents have been demonstrated to be effective treatment methods for soil, ash and sediment. Since these agents may be selected for use at the Site, information on the primary chemical reactions related to the use of these agents is provided. If, during final design, other stabilization agents are selected for use at the Site, test results demonstrating effectiveness and a description of the primary chemical reactions would be submitted to the USEPA.

Information on the chemical reactions and process conditions related to the use of portland cement as a stabilization agent is provided in the USEPA "Handbook for Stabilization and Solidification of Hazardous Waste" (EPA/540/2-86/001). Specifically, Section 2.1.3.1 of this USEPA document describes the treatment processes incorporating portland cement as a binding agent. A copy of this information is provided in Appendix 2F.

Information on the chemical reactions and process conditions related to the use of IWT stabilization agents is provided in the USEPA Superfund Innovative Technology Evaluation (SITE) program report "International Waste Technology/Geo-Con In-situ Stabilization and Solidification Applications Analysis Report" (EPA/540/A5-89/004). A general description of the chemical reactions involving both portland and IWT additives is presented in Section 2 ("Overview of Stabilization and Solidification") of this USEPA SITE report. Additional information is provided by IWT in an appendix to this USEPA SITE report (Appendix B "Vendor's Claims for the Technology"). Relevant pages of both sections of the USEPA SITE report have been included in Appendix 2F of this report.

The regulations require a description of the sequence of events which occur during the process. Section 4.9.1 (d) of the FS states that for Remedial Alternative VI, an on-site plant mixer such as a pug mill will be used to stabilize Site material. The key sequence of events in the proposed stabilization process will include:

1. Prepare the Site for installation of the stabilization mixing plant.
2. Mobilize, erect and make operational stabilization mixing plant, including ancillary equipment.
3. Prepare on-site containment cell, install liner system (subbase, primary and secondary liners).
4. Perform initial tests of full scale mixing systems using Site materials. Stabilize and test sample batches of stabilized soil, ash and sediment.
5. Excavate Site material to be stabilized and crush soil and ash prior to stabilization.
6. Stabilize Site material in mixing plant using stabilization agents selected during final design.
7. Place stabilized Site material in on-site containment cell or in interim staging area; record location of stabilized material in cell.
8. Collect representative samples from stabilized Site material and analyze using EP Toxicity or TCLP tests.
9. Evaluate test results.
10. If test results are acceptable, leave stabilized Site material in on-site containment cell or move from interim staging area to on-site containment cell.
11. If test results are not acceptable, remove stabilized Site material from on-site containment cell or interim staging area and process stabilized Site material in mixing plant (second treatment). Place, test and evaluate material as described above. If test results are still not acceptable, repeat this step (third treatment). If unsuccessful, transport for disposal at an off-site RCRA hazardous waste landfill.

A general description of the sequence of events used in stabilization is also provided in Section 6.5.1 of the USEPA report referenced earlier

("Handbook for Stabilization and Solidification of Hazardous Waste"). A copy of the related pages of this USEPA report is included in Appendix 2G of this report. Additional information on project sequencing and the method of on-site stabilization to be used would be provided to the USEPA after final design.

The regulations require that the point of waste generation be identified. The stabilization mixing plant described for Remedial Alternatives V and VI in the FS generates wastes to be placed in the on-site containment cell at only one point: the discharge of the stabilized Site material from the mixing plant. Only Site material stabilized in the on-site mixing plant will be placed in the on-site containment cell.

The regulations require a description of the manner in which the waste is to be managed. The project sequence described above states that the stabilized Site material is to placed directly in the on-site containment cell, tested, evaluated and either left in place or treated a second time. The final design will also evaluate the use of an interim staging area where stabilized Site material may be held and tested before final placement in the on-site containment cell. If an interim stabilization area is selected during the final design, it would be constructed with liner material to comply with state requirements (e.g., § 293.216, Unloading Areas, Transfer Facilities). If test results are not acceptable after a third treatment, the waste would be transported for disposal at a RCRA-approved hazardous waste landfill.

The regulations require that a schematic diagram of the process be provided. A schematic diagram of the stabilization process considered for use at the Site in Section 4.9.1 (d) of the FS for Remedial Alternatives V and VI is presented in Section 6.5.1 of the USEPA report "Handbook for Stabilization and Solidification of Hazardous Waste". A copy of this schematic diagram is provided in Appendix 2G of this report.

3.1.3 § 287.134 *Waste Analysis Plan*

This section specifies the contents of the waste analysis plan required by § 287.132. The waste analysis plan is required to specify the parameters, testing methods, sampling methods and frequency to be used in testing waste prior to disposal. The regulations also state that waste analysis procedures stipulated in § 287.132 (see Waste Analysis Plan, Section 3.1.2.1) and test methods be considered in the preparation of the Waste Analysis Plan required by this section of the regulations.

3.1.3.1 *Evaluation*

The information required by this section of the regulations are also outlined in a specific form contained in PADER's Industrial Waste Landfill Permit Application. The form is designated as Form R.

A completed Waste Analysis Plan will be developed during final design of Remedial Alternative VI, placement of stabilized Site material in an on-site containment cell. The section presents a conceptual description of the Waste Analysis Plan that will be developed during design and discusses the manner in which the Waste Analysis Plan will comply with the substantive technical requirements identified in this section of the regulations and in Form R. Supporting information is also presented in Appendix 3. The following regulatory requirements related to waste analysis are addressed:

Waste Analysis Plan: Parameters
Waste Analysis Plan: Test Methods
Waste Analysis Plan: Sampling Methods
Waste Analysis Plan: Sampling Frequency
Screening of Incoming Waste
Waste Acceptance Procedures
These requirements are stipulated in the regulations and in Form R.

Waste Analysis Plan: Parameters

The regulations require that the parameters for which each residual waste will be analyzed and the rationale for use of these parameters be described. Form R provides a list of twelve parameters, including TCLP analysis, which must be included unless the generator certifies in writing the absence of a particular constituent based on the generator's knowledge of the waste generation process.

The waste to be placed in the on-site containment cell differs significantly from the residual waste that would be accepted and placed in a commercial residual waste landfill. The composition of the stabilized Site material to be placed in the on-site containment cell will be fairly consistent. Information developed during the RI and subsequent studies on the characteristics of the soil, ash and sediment to be stabilized was previously described in Section 3.1.2.1.

The ROD stated that although Site media were analyzed for over 100 organic compounds and inorganic constituents, the chemicals in Site media which required remediation are four inorganic constituents (i.e., lead, copper, zinc and antimony). Based on an assessment of Site conditions and associated potential risks, the ROD selected lead as the only parameter for which a specific cleanup level was established. The list of chemicals for which stabilized Site materials could conceivably be tested should be limited to the parameter, lead, for which a cleanup level has been established and that the ROD considers to be protective of human health and the environment.

In addition, the crushing of soil and ash, the stabilization process and the addition of a specific amount of stabilization agent will produce a relatively uniform material. The concentrations of TCLP or EP Toxicity parameters in leachate from various samples of stabilized material will, by design, all be below the TCLP or EP Toxicity regulatory limits.

A significantly different condition exists at commercial residual waste landfills. Commercial residual waste landfills accept waste from a variety of different waste generation processes. The wastes will vary significantly in chemical composition, leachability and physical properties. It appears that the parameters identified in Form R for waste acceptance testing were developed to address the significant differences in waste characteristics that would be expected at a commercial residual waste landfill.

Many of the twelve Form R parameters, however, are not applicable to the testing of the stabilized Site material that would be placed in the on-site containment cell. As described earlier, the regulations provide that a parameter can be deleted from the list of required analyses if the generator certifies in writing the absence of the constituent. There are certain parameters, such as ammonia nitrogen, that may be present in stabilized Site material but which even in untreated Site material do not present human health or environmental risks requiring remediation. In order to address this issue, it is proposed that an analytical program including analysis of all Form R parameters be conducted during the initial testing. The initial testing of the full-scale stabilization mixing system was described in the project sequence discussion in Section 3.1.2.1 (Waste Generation Processes).

A representative number of samples of stabilized Site material will be collected and analyzed for the twelve parameters listed on Form R. This information will be used to demonstrate that ten of the twelve parameters are not a concern for stabilized material and that monitoring stabilized material for these ten parameters is not needed. Two of the Form R parameters will be included in the monitoring that will be performed on stabilized material. The ten Form R parameters to be tested during the initial stabilization work but for which additional monitoring would not be conducted are:

- pH
- Ignitability
- Reactive sulfide
- Reactive cyanide
- pH of TCLP extract
- PCBs
- Water leaching procedure - COD, total solids, oil and grease or petroleum hydrocarbons, and ammonia nitrogen
- Total solids
- Total volatile solids
- Total oil and grease or petroleum hydrocarbons

The two Form R parameters for which stabilized material will be tested for and acceptance limits will be established are:

- TCLP or EP Toxicity (inorganic constituents only, including copper, nickel and zinc)
- Free liquids

The first five of the ten parameters listed earlier as Form R parameters that would not be included in full scale waste monitoring relate to the characteristics by which PADER and RCRA define a characteristic hazardous waste. The ROD stated that Site material is a characteristic hazardous waste because it exhibits the characteristic of toxicity, which is measured by TCLP or, as discussed in Section 3.1.2.1 (Waste Sampling Plan), EP Toxicity. The ROD did not identify corrosivity (pH), ignitability and reactivity (sulfide and cyanide) as a reason to classify Site material as a hazardous waste.

Stabilization would only diminish or eliminate any ignitability or reactivity characteristics of Site material, which are already below regulatory definitions for hazardous waste. Stabilization would, however, increase the pH of the waste. This increase in pH levels is fundamental to the ability of stabilization to immobilize chemicals, particularly lead, The Stabilization Treatability Study determined that the pH of stabilized soil using ten percent portland cement is 11.965 and the pH of stabilized ash using ten percent portland cement is 11.680. This information was presented on Tables 8 and 9 of the Stabilization Treatability Study. A copy of these tables have been included in Appendix 3A of this report. These pH values are within the acceptable limits of a maximum pH of 12.5 defined in 25 Pa. Code Chapter 261.23. The applicability of this acceptance criteria (i.e., corrosivity) is discussed later in this section (see Waste Analysis Plan).

This would eliminate pH, ignitability, reactive sulfide and reactive cyanide as parameters to be monitored. The pH of TCLP or EP Toxicity extract should also be deleted from the list of monitoring parameters for the reasons described earlier for pH monitoring of the stabilized material: (1) previous test results (see Appendix 3A) demonstrating that the pH of the stabilized materials will be within acceptable limits; and (2) a relatively high pH is necessary for stabilization to be effective. Also, the addition of acidic material to samples during the TCLP or EP Toxicity tests will lower the pH of the stabilized material, ensuring that the pH of the liquid extract will also be within acceptable pH limits.

Testing for PCBs, chemical oxygen demand (COD), total solids, total volatile solids, oil and grease or petroleum hydrocarbons an ammonia nitrogen is not needed since these materials: (1) have either been shown through the RI sampling to be absent from Site materials or present in untreated Site material in concentrations that do not require remediation (i.e., PCBs, volatile organic compounds); or (2) would not be expected to be present in Site material (soil, ash or sediment) in concentrations requiring remediation based on an understanding of previous Site history and use (i.e, COD, oil and grease or petroleum hydrocarbons and ammonia nitrogen). The stabilized material to be placed in the on-site containment cell will be a solid and the monitoring for total solids, which is relevant only to liquids, is not applicable to stabilized Site materials.

Consequently, TCLP or EP Toxicity testing for inorganic constituents, including copper, nickel and zinc, and free liquid tests will be used to determine the acceptability of stabilized Site materials for placement in the on-site containment cell. The test methods and performance criteria related to these tests are described in subsequent parts of this section (i.e., sampling and analysis methods, frequency, waste acceptance procedures).

Waste Analysis Plan: Test Methods

The regulations require that the test methods to be used for each parameter be defined. The test methods to be used to determine the acceptability of stabilized Site material for the parameters identified above are as follows:

TCLP: The TCLP test methods defined in Appendix II to RCRA at 40 CFR 261.24 (Toxicity Characteristics) will be used to determine the acceptability of placing stabilized Site material in the on-site containment cell. As discussed in Section 3.1.2.1 (Waste Sampling Plan), the EP Toxicity test may be used in place of the TCLP test. The EP Toxicity test methods that would be used are defined on page 33127, Federal Register 1980 (40 CFR 261.24, Appendix II, prior to revision to replace EP Toxicity with TCLP test procedures).

Free Liquids: The free liquids test defined in USEPA Method 9095, the Paint Filter Liquids Test, will be used to determine the acceptability of placing stabilized Site material in the on-site containment cell.

The ten Form R parameters to be tested for during the initial full-scale stabilization activities will be tested using the methods defined in the following references, as recommended in Form R:

1. USEPA's Test Methods for Evaluating Solid Waste (SW-846, most recent edition).
2. Methods for Chemical Analysis of Water and Wastes (EPA/4-79-020).
3. Standard Methods for the Examination of Water and Wastewater (prepared jointly by the American Public Health Association, American Waterworks Association and Water Environment Federation).

Waste Analysis Plan: Sampling Methods

Samples of stabilized materials will be collected using standard USEPA protocols for the collection of soil samples defined, where applicable, in the references cited above under Test Methods. Sample collection, preservation and handling procedures for TCLP samples to be used in monitoring stabilized Site materials would be those defined in USEPA Method 1311 Toxicity Characteristics Leaching Procedure, Section 6.0, referenced in RCRA at 40 CFR 261.24 as Appendix II. If EP Toxicity testing is used, as discussed in Section 3.1.2.1 (Waste Sampling Plan), sample methods would be those defined in Federal Register 1980, pages 33127 and following.

Waste Analysis Plan: Sample Frequency

Three stages of sample frequency would be used in testing stabilization: (1) sampling and analysis for all Form R parameters during the initial stabilization period (approximately 500 cubic yards); (2) sampling and analysis for TCLP or EP Toxicity tests during the beginning of the full scale operation (approximately 1,000 cubic yards); and (3) less frequent sampling and analysis for TCLP or EP Toxicity tests during the remaining full scale operation. Every load will be analyzed using the test procedure for free liquids. TCLP or EP Toxicity tests will be limited to inorganic constituents, including copper, nickel and zinc. This sampling frequency is described in more detail below.

Five samples of stabilized Site material will be collected during the initial stages of stabilization operation. It is anticipated that approximately 500 cubic yards of Site material will be stabilized during this period. As a result, these five samples will be collected at a frequency of approximately one sample for each 100 cubic yards. These five samples will be analyzed for all of the twelve parameters listed in Form R described earlier. At least one sample will be collected from each of the three Site materials to be stabilized: soil, ash and sediment. Every load will be analyzed using the test procedure for free liquids.

After the initial stages of stabilization operation, four additional samples would be collected at a frequency of approximately one sample for every 250 cubic yards of stabilized Site materials. These samples would be analyzed using TCLP or EP Toxicity test methods. Samples of the stabilized Site materials to be generated during the remainder of full scale stabilization operations will be collected at a frequency of approximately one sample for every 1,000 cubic yards of stabilized materials. These samples will be analyzed using the TCLP or EP Toxicity test method. Every load will be analyzed using the test procedure for free liquids.

Screening of Incoming Waste

The regulations require that the plan describe the method for screening and monitoring incoming waste to ensure that the disposal or processing of the waste is consistent with the permit. Form R requires that a visual method of assessing each waste load received at the facility for texture, density or particle size be included. The regulations require that the manner in which rejected waste will be managed be described.

These regulations are clearly applicable to commercial residual waste landfills where the characteristics of waste loads will vary considerably. As discussed previously, only stabilized Site material will be placed in the on-site containment cell proposed in Remedial Alternative VI. Leachate characteristics and physical properties of successive loads of stabilized Site materials will be designed to meet the same performance criteria (i.e., TCLP or EP Toxicity and free liquids tests). The chemical composition of stabilized Site material will be similar to untreated soil, ash and sediment, which contain similar constituents requiring treatment and containment (primarily lead). Few, if any, variations in successive loads of stabilized Site material are expected.

As a result, a screening procedure for stabilized Site material is not needed. Nevertheless, the performance testing to be conducted to demonstrate the effectiveness of stabilization would be used to screen stabilized Site material prior to placement in the on-site containment cell. The sampling and analysis parameters, frequency and methods described earlier in this section would be used to screen incoming waste if Remedial Alternative VI were selected. Incoming waste for this remedial alternative is defined as stabilized Site material, which is the only waste to be placed in the on-site containment cell.

In addition to the periodic Form R and TCLP or EP Toxicity tests and the continuous (i.e., every load) free liquid tests, the stabilized Site material would be visually inspected for texture, density and particle size. Since all of the stabilized Site material would be subject to the same crushing and stabilization treatment processes, successive loads would, by design, exhibit a similar texture, density and particle size.

The regulations require that the manner in which waste, rejected from placement in a residual waste landfill is managed, be described. As described in Section 3.1.2.1 (Waste Generation Process), stabilized Site material would either be placed in a special section of the on-site containment cell or in an interim staging area. The material would then be tested. If the results are not acceptable, the stabilized Site material would either be excavated from the on-site containment cell or removed from the interim staging and returned to the treatment area. This stabilized Site material would then be treated a second time, including crushing and stabilization using additional stabilization agents. The select use of other stabilization agents during re-processing of stabilized materials would be evaluated during final design. For example, propriety agents that might be too difficult to use on a continuous basis may be used to improve treatment performance during re-processing. The re-processed waste would then be tested and, if not acceptable, treated and tested a third time. If the results of the third test are unacceptable, the waste load would be transported off-site to a RCRA-approved hazardous waste landfill. The manifest for this waste would be for a D008 RCRA hazardous waste.

<u>Waste Analysis Procedures</u>

Although not referenced in this section of the regulations, Form R requires that a waste analysis procedure be developed to determine the acceptability of a waste for disposal at a facility. Form R lists the following requirements for a Class I residual waste landfill:

- concentration limits in leachate for each parameter applicable to the waste;
- pH limits;
- ignitability and reactivity;
- free liquids; and
- compatibility of waste and leachate with other waste and leachate.

The concentration limits that would be used to evaluate whether the results of the TCLP or EP Toxicity performance (and waste screening) tests are acceptable are the TCLP regulatory limits for inorganic constituents defined in RCRA at 40 261.24. The concentration limits for copper, nickel and zinc in leachate will be equal to 100 times the drinking water standards or action level for these constituents. The resulting concentration limits for these constituents would be as follows:

copper = 130 mg/l (based on USEPA action level of 1.3 mg/l)
nickel = 10 mg/l (based on USEPA MCL of 0.1 mg/l)
zinc = 500 mg/l (based on USEPA secondary MCL of 5.0 mg/l)

Based on the existing information, the stabilized materials are not expected to exceed these action levels. In any event, copper, nickel and zinc are not TCLP parameters and under PADER and USEPA RCRA regulations are not used to classify waste as RCRA hazardous. As a result, waste that does not pass the TCLP or EP Toxicity tests for copper, nickel or zinc may be placed in the on-site containment cell if additional measures are implemented (e.g. use of additional stabilization agents or multiple stabilization steps). These measures would be defined during final design and submitted to USEPA for approval.

As described earlier (Waste Analysis Plan: Parameters) stabilized material typically exhibits a high pH. The Site material stabilized during the stabilization treatability study exhibited a pH below the RCRA pH limit of 12.5. The stabilization process would be designed to comply with this limit, but single exceedances should not cause a waste load to be rejected. Since the waste will be placed in the on-site containment cell with other stabilized material, an average pH should be used to measure compliance.

As described earlier (Waste Analysis Plan: Parameters) it is unlikely that stabilized Site materials would exhibit the characteristics of ignitability or reactivity. The ROD identified toxicity as the hazardous characteristic of Site material and did not identify ignitability or reactivity. These parameters will be tested on a limited basis (see Waste Analysis Plan: Sample Frequency) and compliance would be measured by comparison to the hazardous waste limits specified in 25 Pa. Code Chapter 261.21 and Chapter 261.23.

Free liquid content would be measured by the USEPA Method 9095, the Paint Filter Liquids Test. Compliance will be measured by comparison to the criteria established in the test (i.e., no free water present in the waste).

The regulations require that a laboratory compatibility test protocol be established to evaluate the compatibility of a waste and/or leachate with other waste and/or leachate already existing at the facility. This requirement is not applicable to the on-site containment cell proposed in Remedial Alternative VI for two reasons. First, there is no waste already existing at the facility. Second, compatibility is not a concern since only stabilized Site material which, as described earlier, are similar in physical properties and chemical composition, will be placed in the on-site containment cell. As a result, a waste and/or leachate compatibility test would not be needed.

3.1.4 § 288.112 Facility Plan

This section of the regulations requires that a facility plan consisting of conceptual drawings and a narrative description be provided which defines the following:

1. The general operational concept for the proposed facility, including:
    - the origin, composition and weight or volume of solid waste that is proposed to be disposed at the facility;
    - the type of liner system;

- the proposed capacity of the facility;
- the expected life of the facility; and
- the size, sequence and timing of solid waste disposal operations at the facility.

2. The quantity, quality and availability of acceptable cover material and liner system construction material, both on and off the proposed permit area.

3.1.4.1 *Evaluation*

The following evaluation addresses each of the items referred to in this section of the regulations. Specific information supporting this evaluation, much of which was already developed as part of the RI/FS, is identified and included an appendix to this report. The information required by this section of the regulations is also outlined in a specific form contained in PADER's Industrial Waste Landfill Permit Application. The form is designated as Form 1R. A completed copy of this form is included in Appendix 4 to this report.

Waste Origin

Only stabilized Site material would be placed in the on-site containment cell proposed by Remedial Alternative VI. In accordance with the ROD, the following materials will be stabilized and placed in the on-site containment cell:

- On-site and adjacent off-site soil containing lead in concentrations above 500 ppm resulting from Site operations (excluding soil beneath buildings and concrete slabs constructed after 1963, or pavement, which will be maintained to prevent migration of soil).

- Sediment from the banks of the Pond containing lead in concentrations above 500 ppm and the top two feet of sediment from the Pond bottom.
- Sediment located within the storm water sewer system located at the Site.
- All ash present at the Site.

The potential human health and environmental risks posed by the organic compounds and inorganic constituents were evaluated in the baseline human health assessment and the ecological assessment and was summarized in the ROD. As a result of this work, the ROD identified lead in concentrations exceeding 500 ppm as the chemical and cleanup level in Site material that would require remediation. This material will be tested, evaluated and, if acceptable, placed in the on-site containment cell. Site material to be treated in the on-site stabilization mixing plant will be the only source or origin of waste to be placed in the on-site containment cell.

Weight and/or Volume of Waste

The regulations require that the weight and/or volume of waste to be disposed at the facility be defined. This section describes the calculations performed to estimate the total quantity of all Site material, including soil, ash and sediment, to be stabilized and placed in the on-site containment cell. The waste quantity is equal to the soil, ash and sediment to be remediated and the quantity of the stabilization agents to be used during treatment.

The FS included a detailed description of the information and calculations used to compute the quantity of soil, ash and sediment to be stabilized and placed in the on-site containment cell. The waste quantity presented in the FS was calculated based on an on-site lead cleanup level of 1,000 ppm for soil. The ROD modified this to an on-site lead cleanup level of 500 ppm. The information and calculations used to determine the quantity (weight and volume) of soil containing lead in concentrations above 500 ppm are presented in Appendix 4A. The total quantity of soil expected to contain lead in concentrations exceeding 500 ppm is 26,273 cubic yards or 48,343 tons. The weight of soil to be remediated was estimated based on a density measurement for Site soil of 136.2 pounds per cubic foot, or 1.84 tons per cubic yard.

The quantity of waste to be placed in the on-site containment cell is described in Section 4.2.1 of the FS. The dimensions of the five ash piles located at the site were measured. The total quantity of ash to be remediated is 165 cubic yards, or approximately 300 tons. This includes approximately one to two feet of soil cover placed over the ash piles to prevent migration.

These are two sources of sediment to be remediated and placed in the on-site containment cell: (1) the Pond and Creek sediment; and (2) storm water sewer system sediment. The calculation of the quantity of Pond sediment was described in Section 4.2.3 of the FS. The ROD calls for the removal of sediment from the banks of the Pond in addition to the removal of approximately two feet of sediment from the bottom of the Pond. The FS calculations include the bank sediment by using the overall dimensions of the pond (approximately 25,500 square feet) instead of the pond bottom only. The area of the pond bottom is less than this area since the sloped banks will decrease surface area. As a result, the estimated quantity of 1,900 cubic yards of sediment from the Pond is a reasonable estimate of the amount of this material to be treated and placed in the on-site containment cell. The amount of sediment to be removed from Mill Hopper Creek will be minimal, based on the RI sampling results and the physical limits of the Creek. The quantity of Mill Hopper Creek sediment is addressed by the over-estimate of the Pond sediment to be remediated.

The quantity of storm sewer system sediment was described in Appendix C of the FS. A maximum quantity of 25 cubic yards of sediment was estimated to be present in the catch basins, sewer lines and other system components comprising the storm water sewer system. This estimate assumed that sediment has completely filled all sewer lines. This over-estimated the quantity of sediment in the storm water sewer system since some sewer lines are not filled with sediment, as determined through visual inspection.

The total quantity (i.e., volume) of Site material to be treated and placed in the on-site containment cell, not including stabilization agents, is as follows:

Soil:	26,273 cubic yards
Ash:	160 cubic yards
Pond Sediment:	1,900 cubic yards
Sewer Sediment:	25 cubic yards
Total =	28,358 cubic yards

The total weight of this material, based on a density measurement of 1.84 tons per cubic yard, is approximately 52,200 tons. The Stabilization Treatability Study identified a ten percent by weight addition of portland cement as an effective stabilization material for soil and ash. However, the study determined that the addition of this quantity of portland cement to soil and ash, combined with stabilization treatment processing, did not result in any increase in volume. Tables 8 and 9 (see Appendix 3A of this report) reported that a ten percent addition of portland cement actually results in a three percent decrease in soil volume and a four percent decrease in ash volume. This is understandable considering the chemical and physical reactions that occur between portland cement and soil. As a result, the volume of stabilized Site material to be placed in the on-site containment cell is equal to the volume of Site material (i.e., not including stabilization agents). The weight of stabilized Site material to be placed in the on-site containment cell, however, would include the weight of stabilization agent (estimated as ten percent of the weight of Site material). The total weight and volume of waste to be placed in the on-site containment cell is as follows:

Weight of waste to be placed in the on-site containment cell =	57,400 tons
Volume of waste to be placed in the on-site containment cell =	28,400 cubic yards

<u>Liner System</u>

The liner system presented in Remedial Alternative VI for the on-site containment cell will consist of the following components:

- protective cover, including leachate collection zone;
- primary liner;
- leachate detection zone;
- secondary liner; and
- subbase.

A conceptual design of this liner system was presented in Section 4.9.1 (e) of the FS. A modified conceptual design is also presented in Appendix 11B and in Section 3.1.13. The liner will be constructed of a protective soil cover, geotextile, geomembrane and synthetic drainage material. A description and evaluation of this proposed cover design is presented in Section 3.1.13, Liner Systems and Leachate Control Plan.

Capacity

Two areas of the Site were evaluated as possible disposal unit locations: (1) the shale pit in the southwest corner of the Site; and (2) an area in the northeast corner. The areas were evaluated to determine if they offered sufficient capacity for stabilized Site materials. The calculations performed to determine the adequacy of each area was described in Section 4.9.1 (e) of the FS. Capacity calculations were presented in Appendix D of the FS. A description of the two Site areas considered for use as the on-site containment cell, including the capacity of each area, is provided below.

The shale pit is an existing depression 600 feet long (east-west) and 100 feet wide. There is very little soil overlaying bedrock in this area. The physical stability of this bedrock would be more than adequate to support a disposal unit. The log of rock core C-C, located in the eastern end of the shale pit, and the downhole geophysical log of MW-5, located to the west of the shale pit, indicate the underlying lithology to be shale, sandy shale and siltstone. These rock types are typical of the Mauch Chunk Formation and will provide a competent structural base for a disposal unit. A conceptual design of the area of the shale pit to be used for disposal and associated storm water control measures was shown on Figure 4-6 in the FS. After removal of soil containing lead in concentrations in excess of 500 ppm from the slopes of the shale pit, the side slopes of the shale pit would be cut to reduce the existing slope to approximately a 3 horizontal to 1 vertical (3H:1V) slope acceptable for liner construction. Approximately 3,000 cubic yards of soil and bedrock material would be removed from the side slopes of the shale pit. These materials would be placed at the bottom of the shale pit.

An area in the northeast corner of the Site was also evaluated as an alternative to the shale pit. A geotechnical investigation was performed in this northeaster area in August 1990 to determine soil thickness, thickness of the weathered rock zone, soil stratigraphy and soil properties. The results were described in Appendix E of the FS, Geotechnical Report. The report stated that an on-site containment cell could be constructed in this area that would provide adequate capacity and would be structurally sound. The base of the cell would be approximately 400 feet long and 350 feet wide. Two scenarios for constructing the northeast cell were analyzed:

- The soil will be excavated to a depth at which competent rock is present. The base of the cell will generally follow the slope of the competent rock layer, approximately ten to fifteen percent.

- Both the soil and rock will be excavated to a depth which will provide a relatively flat bottom for the cell.

The overall footprint of a cell under the first scenario would be somewhat larger than that of a cell in which the soil and rock were both excavated to provide the flat bottom cell. This is due to the fact that a greater amount of material will be excavated from the hillside with the second scenario, thus providing greater volume with a smaller footprint.

It was concluded in the Geotechnical Report that the second scenario would be preferred since it provided a lower friction angle and increased capacity. The report also concluded that similar to the shale pit, if the on-site containment cell were constructed in the northeast area it would be constructed on competent bedrock. As a result, settlement would not occur, thus eliminating any risk of liner failure due to settlement.

The capacity of both areas was computed. The capacity depends on: (1) the slope of the final cover; (2) the thickness of the subbase, liner and cover. The capacity of each area considered for use as the on-site containment cell location is described below.

The capacity of the northeast area (second scenario, flat bottom cell) was computed in sequence. The volume of the excavated area from the bottom of the cell to the top of an embankment to be constructed around the cell was computed first. Then the volume from the top of the embankment to the top of the final cover was computed. The maximum final cover slope was used. These volumes were added to obtain the cumulative available volume. Finally the volume that would be occupied by the subbase, liner and cover was computed and subtracted from the cumulative available volume. As discussed later in this report (Section 3.1.16, Minimum Groundwater Distances), the top of the subbase must be a minimum distance from the seasonal high ground water table and the regional ground water table. These is a more than adequate distance from the bottom of the northeast cell to either the seasonal high ground water table or the regional ground water table. Consequently, the subbase for this cell would be constructed with a six inch minimum depth.

The capacity calculation results for the northeast cell area are as follows:

Volume, bottom to embankment:	45,375 cubic yards
Volume, embankment to final cover:	20,925 cubic yards
Subtotal, cumulative available volume:	66,300 cubic yards
Volume, subbase, liner and cover:	- 31,800 cubic yards
Total available volume (capacity):	**34,400 cubic yards**

The total available capacity of the northeast cell for the placement of stabilized Site material is 34,400 cubic yards. As described earlier in this section (Weight and/or volume of waste) the total amount of stabilized Site material to be placed in the on-site containment cell is approximately 28,400 cubic yards. This would leave approximately 6,100 cubic yards of excess capacity. The northeast area, then, has the capacity needed for containment of stabilized Site material.

The capacity of the shale pit was computed in a similar manner. However, an evaluation of the ground water table elevations in the shale pit area determined that the depth of the subbase in this area would have to be increased to maintain a suitable vertical distance. This evaluation determined that the seasonal high ground water table occurred at elevation 1642 feet (see Section 3.1.16). As a result, the subbase must be constructed so that its final elevation is equal to or exceeds elevation 1650 feet. All elevations are in feet above mean sea level. This would require the addition of approximately 8,300 cubic yards of soil. This soil may be obtained from areas of the Site where lead concentrations in soil are below 500 ppm or a suitable source of off-site soil will be used. The volume calculations for the shale pit area are as follows:

Volume, bottom to embankment:	17,930 cubic yards
Volume, embankment to final cover:	18,650 cubic yards
Subtotal, cumulative available volume:	36,580 cubic yards
Volume, subbase, liner and cover:	- 6,880 cubic yards
Total available volume (capacity):	**29,700 cubic yards**

The total available capacity of the shale pit area for the placement of stabilized Site material is 29,700 cubic yards. As described earlier in this section (Weight and/or Volume of Waste) the total amount of stabilized Site material to be placed in the on-site containment cell is approximately 28,400 cubic yards. This would leave approximately 1,300 cubic yards of excess capacity. The shale pit area, then, has the capacity needed for containment of stabilized Site material.

Expected Facility Life

The regulations require that the expected life of the facility be estimated. The on-site containment cell would only be used for containment of the soil, ash and sediment to be excavated and stabilized on-site. The FS

(Section 4.9.2.5) and the ROD (page 52) estimated an overall remediation period of 18 months. This includes time for excavating Site materials and replacing excavated soil and sediment. The time period from the beginning of the construction of the on-site containment cell to the placement of the final cover is estimated to be approximately one year, computed as the sum of the time required for liner and cover construction and for stabilization. Long-term monitoring of the on-site containment cell would begin at the end of this one year construction period.

Size, Sequence and Timing of Disposal

As previously stated, the on-site containment cell will only be used for stabilized Site material. As described in the project sequence description (Section 3.1.2.1, Waste Generation Process), stabilization would begin once the on-site stabilization mixing plant is operational. The cell liner would have been installed to coincide with the beginning of stabilization operations. Then, site material will be stabilized, tested and placed in the on-site containment cell. When all Site material, as prescribed in the ROD, is stabilized, tested and placed in the on-site containment cell, the cell will be brought to final grade and the final cover will be installed.

Cover and Liner Material Availability

A conceptual design was presented in Section 4.9.1 (e) of the FS for the cover and liner systems. The design primarily relies on synthetic materials, including geotextile, geomembrane and synthetic drainage layer material. These materials are available from a variety of different vendors. These materials are relatively compact and can be transported easily. As a result, they can be obtained from sources across the country. No problems are foreseen in obtaining adequate quantities of cover and liner materials. These materials will be specified during final design and comply with the technical requirements of the PADER residual waste regulations.

Additional information on liner and cover systems is provided in Section 3.1.13 of this report.

Soil is also required for use in constructing the subbase, embankment (northeast area) and a final cover. Fill and topsoil are both needed. Relatively limited quantities of both materials would be needed for construction of either the northeast or the shale pit area cells. Suitable sources, whether from on-site areas, pre-tested off-site areas or both, will be identified during final design. This information will be provided to the USEPA and PADER for review and approval.

3.1.5 § 288.113 Maps and Related Information

This section of the regulations describes approximately 16 items which the application for a residual waste management unit needs to provide. These items can be presented in narrative or shown on one or more topographic maps.

The items are: 1) boundaries and names of present owners of the land (surface and subsurface) as well as a description of title, deed and any usage restrictions; 2) boundaries of land affected by the proposed operation; 3) location of areas which are proposed for excavation to obtain earthen materials for construction and/or cover; 4) location and name of public and private water sources within one-half mile; 5) location name and elevation of surface water bodies within one-quarter mile; 6) location of active or inactive gas and oil wells, surface and underground coal and noncoal mines, coal seams to a depth of 500 feet, mine spoils piles, dumps, dams, embankments and mine pool discharge points within one-quarter mile of the Site; 7) rights-of-way for utilities within one-quarter mile; 8) buildings which are in use within one-quarter mile; 9) location of other solid waste disposal or processing areas within one-quarter mile including owners of such facilities; 10) anticipated location of water quality monitoring points; 11) boundaries of land where class I residual waste landfills are prohibited; 12) location and elevation of test borings and core sampling; 13) municipality in which the project is located; 14) location of sinkhole, fractures, fracture traces outcrops, lineaments, and mine pools in project area and adjacent areas; 15) location of water discharges to surface water bodies; and, 16) location of 100 year floodplain boundaries within the permit area.

Finally, this section of the regulations also specifies that public water sources within three miles downgradient of the Site be identified on a map and that a USDA Soil Conservation Service soil map be provided.

3.1.5.1. Evaluation

The information requirements referred to in this section are also outlined in a specific form contained in the PADER Industrial Waste Landfill Permit Application. The from is designated 2R.

The documents prepared during the RI/FS address the items requested in this section of the regulations or in Form 2R. The existing information is consolidated in this evaluation report for easier review. A copy of the Form 2R is provided in Appendix 5. Additionally, maps and figures gleaned from the various RI/FS documents, or prepared for this evaluation, are included in supplemental sections within this appendix. The following text briefly summarizes the information provided for each of the 16 aforementioned items.

Topographic Map

Plates 1 and 2 are topographic maps of the Site, including the two areas where construction of an on-site containment cell may occur. Radii of various distances from the edges of the on-site containment cells, based on a maximum volume capacity design for stabilized materials as presented in the FS Report, is shown in these plates.

Site Boundaries and Present Landowners

The boundaries of the Site are shown on Plates 1 and 2. Tax parcel 11, noted on Plate 1, is presently owned by C&D Recycling, Inc. a Pennsylvania corporation. This is the parcel where the two possible locations of an on-site containment cell are shown. The current zoning and restrictions on the deed were previously described in section 3.1.1.1 *Evaluation*, Water and Land Use.

Boundaries of Affected Land

The proposed areal extent of two possible on-site containment cells is shown in Plates 1 and 2. Since the purpose of the on-site containment cell is solely for the placement of stabilized materials, there is no planned sequencing of cell construction. The areas depicted on the Plates represent a maximum volume capacity containment cell design for stabilized materials as indicated in the FS Report.

Proposed Excavation Areas

As previously stated, the shale pit location is an existing depression. Hence, if the on-site containment cell is constructed at this location, the extent of excavation activities will be only to regrade the existing slopes and base of the shale pit and prepare it for construction of the subbase. In contrast, construction of an on-site cell in the northeastern portion of the Site will require excavation prior to placing a subbase. The areal limits of two possible on-site containment cells shown in Plate 1 and 2 encompass the maximum area where regrading or excavation activities will take place. (As previously mentioned, the areal extent of the two on-site containment cells shown in Plates 1 and 2 represent a maximum volume capacity design as described in the FS Report). The type of earthen material which will be used for covering the on-site containment cell will be determined in the remedial design. The liner construction is discussed in section 3.1.13.1.

Public and Private Water Sources within One-Half Mile

There are no municipal (public) water supplies within one-half mile of the Site. As discussed in section 3.1.1.1 *Evaluation,* Water and Land Use, there are a number of private drinking water wells in the area of the Site. Most of these are individual residential wells with the exception of the supply well(s) at the Maple Lane Trailer Park (which may constitute a public water system) and Hickory Hills which provides water to some of the private residents in the community. The approximate location of these wells, along with distance from the two possible on-site containment cell locations, is shown in Plate 1. (Note, the two wells on Hickory Hills property to the northeast of the Site are not currently operating and have not been tied into any potable water system). Since the distances are from the limits of an on-site containment which represents the maximum volume capacity design for stabilized materials, these radii represent the most conservative ("worst case") distance estimates.

Surface Water Bodies within One-Quarter Mile

The only surface water body within one-quarter mile of the Site is the Pond and portion of Mill Hopper Creek upstream of the Pond. The approximate elevations of these surface water bodies are indicated in Plate 2.

There is an artesian well on the Site which flows during certain times of the year. The location of this well, which feeds Mill Hopper Creek during the time it flows, is noted on Plate 2. As previously stated in section 3.1.1.1

the time it flows, is noted on Plate 2. As previously stated in section 3.1.1.1 *Evaluation,* Wetlands, the wetlands within one-quarter mile of the Site are the Pond and the immediate edges of Mill Hopper Creek. A field inspection of the area around the artesian well concluded that the area was not a wetland but more likely the headwaters of Mill Hopper Creek.

Erosion control measures were implemented at the Site at the direction of USEPA to manage storm water runoff from the Site so that contaminated soils were not spread over a large area. This work involved construction of storm diversion channels using rip-rap. Also, a corrugated pipe serves to convey storm water from the northwestern portion of the Site and underneath the adjacent Brickyard Road and into the field to the west. Some of this storm water flow also travels south along a drainage swale which parallels the western edge of Brickyard Road.

Inactive Wells, Mines, etc. within One-Quarter Mile

There were no inactive oil or gas wells located within one-quarter mile of the Site identified during the background search. Although, coal mines exist north and south of the Site, they are not within one-quarter mile. No other types of mines were identified during the background search. Similarly, existing geologic information indicates that there are no subsurface coal seams at a depth of 500 feet. Appendix 5A includes figures from the RI Report which show the location of the coal mines and the Site and a general geologic cross-section which indicated the coal deposits do not extend under the Site.

At least one coal spoil pile was observed within one quarter mile north of the Site. There may be other mine spoil piles in the area which are difficult to identify since they are now covered with vegetation. The mine pools associated with the coal mines north and south of the Site appear to be outside the one-quarter mile radius.

Location of Rights-Of-Way

There were no high tension power line or pipeline rights-of-way which are within one-quarter mile of the Site located during the background search. However, there is an abandoned rail spur within this radius. This spur is shown in Plate 2. The public road within one-quarter mile of the Site is Brickyard Road which runs along the western Site boundary. A private road runs along the northern and eastern Site boundary.

Buildings In Use

The building located on-site (see Plate 2) is used by security guards posted at the Site. The remaining buildings on the Site are in disrepair and are unoccupied. The off-site buildings which are in use and within one-quarter mile of the Site are the same ones which have residential wells noted on Plate 1. As mentioned previously, the section of Hickory Hills which lies adjacent to the northeastern portion of the Site has not yet been developed.

Other Solid Waste Disposal or Processing

There were no solid waste disposal or processing operations identified within one-quarter mile of the Site.

Location of Water Quality Monitoring Points

There have been a number of monitoring wells installed on-site to characterize ground water quality as part of the RI/FS. A map showing the location of these wells and a table summarizing the construction specifics is provided in Appendix 5B. Some of these wells will be used as ground water sampling points for monitoring after the on-site containment cell is closed.

Additional ground water monitoring points may be added at the time of design based on the final location of the on-site containment cell.

Boundaries Where Class 1 Residual Waste Landfills Are Prohibited

The prohibition of Class 1 residual waste landfills is based on a review of the oh criteria (see *section 3.1.14.1*). A preliminary review of these criteria, as they applied to the shale pit location, were contained in the FS Report. This reviewed concluded that a Class 1 Residual Waste Landfill, more specifically an on-site containment cell for stabilized materials, would not be excluded from this area of the Site. This finding also applies to the area in the northeastern portion of the Site. A more detailed description of this evaluation is provided in section *3.1.14*.1.

Elevation of Soil Borings and Core Sampling

A total of four rock cores were collected at the Site during the RI. The location of these rock cores is shown in Appendix 5C. Additionally, each of the monitoring well locations shown in the figure in Appendix 5B was logged during drilling. A suite of geophysical logs were also compiled at many of these same locations. Although the geophysical logs are not reproduced here, a complete set was provided in Appendix H of the Final Draft RI Report dated March 8, 1991.

As part of the FS, a geotechnical evaluation was completed in the northeastern portion of the Site. (A geotechnical evaluation was not needed in the area of the shale pit because prior shale mining had exposed the bedrock surface in much of this area). There were 13 test borings and three rock cores completed in the northeastern portion of the Site. The location of these test borings and additional rock cores is shown in a figure in Appendix 5C.

The elevations of test borings, rock cores and monitoring wells are indicated on the topographic map which shows the locations. Also, as previously mentioned, Appendix 5B contains a summary of the construction specifics of the monitoring wells at the Site.

Municipality

The Site is in Foster Township, Luzerne County, Pennsylvania. Hence, the two possible locations of the on-site containment cell are in this same local.

Structural Geology

Based on the bedrock structure, there were no sink holes identified in the area of the Site during the background search. The presence of fractures, fracture traces or lineaments were assessed during the RI. The subsurface investigation, which included geophysical logging and rock coring identified specific fractures in the subsurface. Additionally, USEPA completed a fracture trace analysis.

A summary of the structure of the area where the Site is located is provided in Appendix 5D (specifically sections 2.4.5 and 2.6.1 and accompanying figure). Additionally, a copy of the portion of the Pennsylvania geologic map which includes the Site is provided in Appendix 5D. This map also indicates the proximity of fault lines near the Site.

Water Discharges Into Surface water

As previously discussed, Mill Hopper Creek is the primary route for surface water runoff to the Pond south of the Site. Some surface water in the northwestern portion of the Site flows to the west, beneath Brickyard Road. However, storm water from one of the two possible areas for construction of an on-site containment cell would be conveyed to Mill Hopper Creek. This creek is indicated on Plate 2.

Floodplain Boundary

The 100 year floodplain boundary does not occur on the Site. The nearest such boundaries are adjacent to Pond Creek, north of the Site and Mill Hopper Creek, south of the Pond (see the evaluation portion of section *3.1.14 Areas Where Class I Residual Waste Landfills are Prohibited* and Appendix 12A).

Municipal Wells within Three Miles

There were no municipal wells within three miles downgradient of the Site. The downgradient direction ground water flow direction is southerly. The closest municipal supply wells are owned by the White Haven Water Company, White Haven Water Authority, Freeland Water Authority and Sandy Run Water Authority. The White Haven Water Company and White Haven Authority wells are northeast and hydraulically upgradient of the Site. Of note, the White Haven Water Authority also maintains an emergency surface water reservoir approximately one mile northeast of the Site. The Freeland Water Authority wells and the Sandy Run Water Authority wells are located southwest of the Site. Hence, since ground water flows southerly, these municipal wells are also not hydraulically downgradient.

Soils

A copy of the portion of the Soil Survey which includes the Site is provided in Appendix 5E. Also, a narrative description of soils at the Site from the RI Report based, in part, on the Soil Survey Report, is contained in Appendix 5E.

3.1.6 § 288.121 *Description of Geology, Soils and Hydrology; General Requirements*

This section indicates that information pertaining to the geology, soils and hydrology of the proposed area and adjacent area be presented on maps and cross-sections. The required information is detailed in *§§ 288.122-288.127*. There are a number of PADER forms which reference the information required in *§§ 288.122 - 288.127* and the specific information requests pertaining to these sections is discussed in following sections *(3.1.7 to 3.1.12)*.

3.1.6.1 *Evaluation*

The documents prepared during the RI/FS contain numerous maps and cross-sections which present information on the geology, soils and hydrology of the proposed area as well as adjacent areas. These maps and figures contain various scales that were selected to best represent the intended information. These maps and figures meet the substantive aspects of the information requested in this section.

3.1.7 § 288.122 *Geology and Groundwater Description*

This section requires a description of the geology and ground water in the proposed and adjacent area to the on-site containment cell. In addition, the section requires the results of test/core borings to more accurately characterize geology, soils, ground water flow, ground water chemistry, and the flow system underlying the proposed and adjacent area to the on-site containment cell.

There is also a requirement for a description of the stratigraphy, lithologic and physical characteristics and thickness of each stratum, including location and depths of aquifers. This section indicates that information on the hydrogeologic characteristics from field tests, geologic structure at the Site and within the region and use of the aquifer needs to be developed for the area.

Lastly, this section requires a description of the aquifer characteristics necessary to describe ground water flow through the subsurface and how water is stored and discharged, along with the extent of coal deposits within the area.

3.1.7.1 *Evaluation*

The information requested in this section of the regulations is also itemized on PADER Forms 6R, 7R, 8R and a portion of 10R. Form 6R addresses the geologic information requirements and Form 7R address the hydrogeologic requirements. Form 8R covers the ground water quality while Form 10R pertains to the portion of this section which applies to the extent of coal and non-coal mineral deposits. A copy of PADER Forms 6R and 7R, with appropriate sections referencing where the information is located, is contained in Appendix 6.

The RI/FS documents contain a detailed description of the geology at the proposed and adjacent area for the on-site containment cell. The following is an analysis of the existing information as requested in the aforementioned PADER Forms 6R and 7R.

<u>Stratigraphy/Lithology</u>

The narrative description of the stratigraphy was provided in section 2.4 to 2.4.4 of the RI Report. These sections are provided in Appendix 6A.

Geologic cross-sections based on rock cores, boring logs and geophysical logs that were obtained at the Site during the RI are provided in Appendix 6B. (The locations are shown in figures in Appendix 6A). A narrative description of the geologic information contained in these cross-sections is also included in Appendix 6B.

The boring logs and coring logs used to develop these cross-sections are contained in Appendix 6C. The boring logs which were completed as part of the geotechnical evaluation, to evaluate the feasibility of placing an on-site containment cell in the northeastern portion of the Site, are also provided in Appendix 6C. (The locations of the borings are shown in figures contained in Appendix 5B and 5C). Those rock cores not subsequently completed as monitoring wells were grouted.

Structure

The geologic structure of the Site and surrounding area was already discussed in section *3.1.5 Evaluation,* Structural Geology and Appendix 5D. Additional information is provided in Appendix 6A.

Hydrogeologic Characterization

The information previously provided in Appendix 5D describes the mechanisms of ground water movement at the Site and immediate vicinity. The movement of ground water is directly related to the geologic structure in the area of the Site. Additional narrative regarding the movement of ground water at the Site is provided in Appendix 6D. This narrative is excerpted from the RI Report and is accompanied by various figures and tables which illustrate the mechanisms of ground water movement beneath the Site. This includes maximum and minimum depths to ground water, 12 month characterization of the ground water table fluctuations and illustrations of ground water flow across the Site. The direction of ground water flow over the period of measurement is southerly across the majority of the Site. During a portion of the year, it is possible for a small component of ground water, in the northwestern portion of the Site, to flow northwest.

The hydraulic conductivity of the formation beneath the Site was determined during the RI. The description of the test methods and results is contained in Appendix 6E. This appendix includes a table which permits determination of the specific yield of the monitoring wells. Although specific transmissivities were not calculated in the RI, average values of approximately 49 ft^2/day in the upper 100 feet of the shallow bedrock and 5 ft^2/day in the lower 20 foot fractured zone can be realized from the data. The upper fractured zone is separated from the lower zone by approximately 100 feet of massive siltstone with only a few, non-water bearing fractures. This was determined from packer pump tests that were conducted at monitoring well locations during the RI. The narrative describing the packer pump tests conducted at the Site is contained in Appendix 6F.

The hydraulic gradient at the Site ranges from approximately 0.15 to 0.45. Assuming a porosity of 5% for shale (Groundwater and Wells, Fletcher Driscoll, 1986), the calculated ground water velocity ranges from about 1.5 to 4.5 ft/day.

As previously discussed, the aquifer beneath the Site is used for potable water in the area. The RI determined that the ground water in the area of the Site exhibited aggressive characteristics (see information in Appendix 6G). These aggressive characteristics could likely be attributed to deep coal mines in the region.

The ground water quality monitoring points used to characterize the hydrogeology beneath the Site are shown on Plate 2 and in Appendix 5B.

The physical details regarding this monitoring network, as requested in PADER Form 7R, are also contained in Appendix 5B.

3.1.8 § 288.123 Groundwater Quality Description

This section requires a description of the chemical characteristics of each aquifer in the proposed area and adjacent area. This chemical characterization must be based on at least two quarters of data with one quarter representative of the highest local groundwater levels. This section also lists a variety of chemical parameters which ground water should be analyzed for. These chemical parameters include both general chemistry indicators (eg. specific conductance, COD, pH) as well as specific inorganic constituents and organic compounds.

The section requires that ground water elevations in monitoring wells be determined based on mean sea level. The monitoring wells are to be constructed and maintained in accordance with a plan approved by PADER. Finally, this section also requires that facilities permitted after July 4, 1992, should have one year of chemical data.

3.1.8.1 Evaluation

The required information covered in this section of the regulations is summarized in PADER Form 8R. This form is included in Appendix 7.

The chemical characteristics of ground water beneath the Site and in off-site areas are based on four separate sampling events conducted during the RI. These sampling events took place between June 1988 and June 1989. The main focus of the multiple sampling events was to determine whether the Site had caused or contributed inorganic constituents or organic compounds to ground water. The resulting data base lead to the conclusion that the Site had not adversely impacted ground water.

The analytical data collected from the monitoring well network at the Site over a 12 month period during the RI is provided in Appendix 7A. This appendix contains a table from the RI Report which highlights all the parameters which were tested for. The summary data sheets only list those parameters which were reported in the samples. Therefore, if a parameter on the table of chemicals which were tested for is not reported on the data summary tables, it was not detected. In the case of the inorganic constituents, both unfiltered and filtered sample results (reflecting total and dissolved concentrations) are presented on the summary tables.

Similarly, a summary of ground water results from residential well samples is contained in Appendix 7B. These samples were also collected during the period of June 1988 to June 1989 and tested for the same parameters noted in Table 3-35b in Appendix 7A. The residential well samples were raw water samples collected from points as close to the well as possible. This was done to eliminate, to the extent possible, any interferences from the water distribution system in the home. The data summary in Appendix 7B identifies only those constituents which were detected in the samples.

Field measurements of temperature, pH and specific conductance were obtained at each sampling event. This information is provided in separate tables, corresponding to the particular sampling event, in Appendix 7A. Similar information for five of the residential wells is provided in Appendix 7B.

There are some general chemistry parameters noted on Form 8R for which there is no data in Appendix 7A or 7B. These are the parameters ammonia-nitrogen, bicarbonate (as $CaCO_3$, COD, chloride, fluoride, nitrate-nitrogen, sulfate, total alkalinity, total filterable residue, TOC and turbidity. (Of note, there is a qualitative statement in the data tables in Appendix 7A and 7B regarding the clarity of the sample). In some instances, the USEPA analyzed select ground water samples for alkalinity and sulfates. Also, there is PADER historic data regarding many of these parameters from residential wells in the vicinity of the Site (see RI Report Appendix A). Nevertheless, the analytical information contained in Appendix 7A and 7B more than adequately covers the parameters which would be of concern if stabilized materials are placed in an on-site containment cell.

The residential well and monitoring well locations are shown on Plate 1 and Plate 2, respectively. The construction specifics of the monitoring wells, including the measuring point elevations based on mean sea level, are contained in Appendix 5B. The locations and construction of the monitoring wells were based on plans approved by USEPA and PADER during the course of the RI. Similarly, the sampling and analytical testing program for the monitoring and residential wells that was conducted during the RI was also approved by USEPA and PADER.

3.1.9 § 288.124 Soil Description

This section requires a description of the soil type in the area where the on-site containment cell is proposed. It also requests a description of the soils which are expected to be used for cover and other cell construction materials. Further requirements covered in this section pertain to the manner of classifying and testing soils which are to be used in the construction of the on-site containment cell.

3.1.9.1 Evaluation

The soil description elements covered in this section of the regulations are summarized on PADER Form F. This Form is contained in Appendix 8. Since components of this form relate to issues associated with the actual design of the on-site containment cell, only certain portions of the form in Appendix 8 are completed.

A narrative description of the soils which are present at the Site and adjacent areas is contained in Appendix 5E. As discussed in section *3.1.1.1 Evaluation,* National Wildlife Refuges and Prime Farmland, the soil designation for the northwestern portion of the Site is cut and fill material. This designation results from the regrading and construction activities which have occurred in this area of the Site. The remaining soil cover at the Site is designated Oquaga and Lordstown channery silt loams. Estimates of the engineering properties of these soils, as presented in the Soil Survey Report, are contained in Appendix 8A.

The discussion in the FS pertaining to construction of an on-site containment cell in the area of the shale pit mentions using Site soils scrapped from the side walls of the pit to construct the subbase. The FS Report also indicates that the liner will be a synthetic material. Depending on the duration of stabilization activities, daily and intermediate cover of the stabilized materials placed in the cell may not be necessary. However, these issues, as well as composition of the final cover, will be determined in the design stage.

3.1.10 § 288.125 Surface Water Information

This section requires a description of surface waters at the Site and surrounding areas. This includes identifying the watershed in which the Site is located and any other watersheds which may be affected by the proposed project. The section requires surface water elevations, flow rates and associated information at the Site and in the surrounding areas. The quality of surface waters which will receive flows from the Site along with information pertaining to the macro-invertebrate community in the identified surface waters are also items covered by this section of the regulations.

3.1.10.1 *Evaluation*

The information requirements in this section are addressed in PADER Form 7R. This is the same form which addressed baseline ground water quality information and previously discussed in Appendix 6.

A narrative description of surface water at the Site and adjacent areas is contained in Appendix 9. This description identifies the drainage basins in the vicinity of the Site and the surface water flow patterns at the Site. The surface water body at the Site is Mill Hopper Creek. This creek drains the Site and conveys surface water to the Pond, located south of the Site. The elevations of the surface water body at the Site, as well as the Pond, south of the Site, is indicated on Plate 2. Seasonal elevations of surface water in the Pond, located south of the Site, are in the table presented in Appendix 6D.

Surface water quality information was obtained from samples collected during the RI/FS. These samples were analyzed for inorganic constituents and organic compounds as well as some general chemistry parameters (pH, temperature, specific conductance and hardness). The analytical results of surface water samples are contained in Appendix 9A. The sample locations are noted on a figure or a table in this appendix. Also, the analytical parameters which surface water sample were tested for during the RI are listed on the Table 3-5a in Appendix 9A. If a parameter is not listed on the data summary table (Table 3-5b), it was not detected. The surface water samples whose locations and results are noted in Tables 1 and 2, respectively, of Appendix 9A were only analyzed for the parameters that are marked in Table 1.

The aquatic environments at the Site and off-site areas were described in the Ecological Risk Assessment (ERA) Report. The results of this report indicated primarily micro-invertebrate species with few macroinvertebrates. These results were discussed in section *3.1.1.1 Evaluation,* Potential Impacts to Terrestrial and Aquatic Flora and Fauna.

3.1.11 § 288.126 Alternative Water Supply Information

This section of the regulations requires a determination to be made as to whether the Site is within the recharge area for a public or private water supply. A detail hydrogeologic study is required if there is a determination made that water supplies may be adversely affected by the construction of an on-site containment cell. For those water supplies which the detailed hydrogeologic study suggest would be adversely impacted, it must be shown how ground water monitoring will prevent adverse impacts. Also, the detailed study should evaluate the feasibility of permanently replacing or restoring the water supply.

3.1.11.1 Evaluation

The information requirements of this section of the regulations are summarized in PADER Form 11R. A copy of this Form, with references to the areas where the requested information is provided, is contained in Appendix 10.

<u>Private or Public Water Sources within One-Quarter Mile</u>

The ground water supplies within one-quarter mile of the Site are shown in Plate 2.

<u>Ground Water Quality</u>

The existing ground water quality data indicates the Site has not impacted ground water. This is significant since the materials currently present on the Site are the ones which will be stabilized and placed in an on-site containment cell. The ground water quality information from Site monitoring wells was previously presented in Appendix 7A.

The potential for chemical constituents to leach from existing contaminated soils at the Site was evaluated in the section 2.0 of the FS Report. The FS Report evaluation relied on a leaching model, laboratory leaching tests and the fate and transport potential of various metallic compounds to ascertain whether ground water would become impacted in the future. The evaluation was a worst-case analysis in that it assumed the soil was not stabilized. The stabilization process would only serve to further bind and immobilize the constituents in the materials which are eventually placed in an on-site containment cell.

The discussion pertaining to the leaching potential evaluation in section 2.0 of the FS Report is contained in Appendix 10A. This appendix includes the tables which summarize the anticipated or measured leachate concentration from soil which has yet to be stabilized. The analysis in the FS Report corroborated the finding that ground water had not been impacted by leaching of constituents from the Site. It also showed that if left untouched, the soil would not likely leach at levels to cause an impact to ground water in the future.

The results of ground water sampling over a period of a year, in conjunction with the leaching potential evaluation of existing soils establishes that the contaminated materials do not pose a threat to the ground water. Therefore, these same materials will not pose a threat to ground water after they undergo stabilization.

Detailed Hydrogeologic Evaluation

A detailed hydrogeologic evaluation was completed as part of the RI. The relevant information from this evaluation is provided in Appendices 5 and 6 (as well as sub-appendices).

Potential Future Impacts on Public or Private Water

As previously stated, there has been no impact to ground water in the area attributable to the Site. Consequently, if the stabilized material which will be placed in the on-site containment cell is simply the same materials which are currently at the Site, the potential for future impacts to water supplies, after stabilization, are remote.

Worst Case Analysis-Maximum Impacts

If a scenario is assumed where the cover of the on-site containment cell fails and the liner is subsequently breached by infiltrating water, that water will likely seep into the subsurface. Such seepage through existing soils and sediment is likely occurring today, with no adverse impact to ground water. Hence, it is doubtful that leachate which comes into contact with the stabilized soil will subsequently impact local ground water supplies.

Compliance Monitoring

There is an existing monitoring well network at the Site. The wells which comprise this network are constructed in various horizons in the bedrock. There are existing Site wells in both possible locations for and on-site containment cell. Additional monitoring wells, as appropriate, will be added during the remedial design once the final location of the on-site containment cell is selected. The new and existing wells will serve to assure that early detection is accomplished in the remote instance ground water becomes impacted.

<u>Restoring and/ or Replacing Existing Water Supplies</u>

As previously discussed, ground water is the sole water source in the area. Although a few communities share common wells (Maple Lane and Hickory Hills) most water supplies around the Site are from private wells. Therefore, replacing or restoring water supplies, in the event an individual supply becomes impacted, would have to focus on well head treatment or a new well (bottled supply is not considered a permanent measure). However, as described above, the possibility that ground water will be impacted from the stabilized materials in the on-site containment cell is extremely doubtful since these same materials have been present at the Site, exposed to the elements in a natural state, and have not impacted the ground water supply in the area.

3.1.12 § 288.127 Mineral Deposits Information

This section of the regulations specifies reporting and mapping requirements if the Site overlies existing workings of an underground mine. If such a situation exists, the report must evaluate the potential for mine subsidence to impact the on-site containment cell.

3.1.12.1 Evaluation

Based on a review of the information developed during the RI/FS, the closest mine to the Site is the Pond Creek Colliery which was mined by the Wyoming and Pond Creek Coal Company from approximately 1910 to 1925. This mine is approximately one-half mile from the Site. The coal deposit occurs in the Llewellyn Formation (see geologic cross-section in

Appendix 6A). This geologic formation does not underlie the Site or the two possible locations of the on-site containment cell or contiguous areas.

Based on this information, there would be no reason to complete the PADER Form 10R or prepare an engineering report to assess potential impacts on the on-site containment cell from the mine.

3.1.13 § 288.412(a)(1) Liner System and Leachate Control Plan

This section describes the requirements for the design and installation of a liner system and for leachate control. The key technical requirements are as follows:

1. Liner System Design: Plans, drawings, cross-sections and specifications for a liner system should be provided.

2. Liner Installation Plan: The regulations require that a plan to install the liner be provided.

3.1.13.1 Evaluation

The following evaluation addresses the items referred to in this section of the regulations. The information required by this section of the regulations is also outlined in a specific form contained in the PADER Industrial Waste Landfill Permit Application. The form is designated as Form 16R, included in this report as Appendix 11. Liner requirements are also addressed in the regulations at § 288.112, Facility Plan (discussed in Section 3.1.4 of this report) and at § 288.423, Minimum Requirements for Acceptable Waste (discussed in Section 3.1.15 of this report).

General

The majority of the information required by this section of the regulations and by Form 16R will be determined in the remedial design. The information required does not pertain to conditions related to the Site, such as the properties of the stabilized materials to be placed in the on-site containment cell or the environmental conditions at the Site. The sole focus of this section of the regulations is the materials that would be used to construct the liner system for the on-site containment cell and the methods that will be used to ensure that these materials are properly installed.

A recent (February 26, 1993) listing of landfills in Pennsylvania identified approximately 60 landfills in the state with a combined capacity as of January 1992 of approximately 143 million tons (approximately 100 million cubic yards). Most, if not all, of these landfills are required to comply with technical liner requirements comparable to those identified in § 288.412 (a) (1) and Form 16R. In addition, liner systems for the containment of hazardous and industrial wastes have been designed for numerous CERCLA and RCRA sites across the country.

These sites have been designed to comply with regulatory requirements that are similar and, in the case of RCRA Subtitle C facilities, more stringent than those of the residual waste landfill regulations. The design, regulatory approval and construction of liner systems for landfill facilities clearly demonstrate that liner materials and methods of installation that comply with regulatory landfill requirements are commercially available. One manufacturer of geomembrane material alone (Gundle Lining Systems, Inc.) has manufactured more than 300 million square feet of high density polyethylene (HDPE) geomembrane, the liner material identified in the FS for use in the construction of the on-site containment cell liner.

This is enough material to line over 1,000 cells with a similar capacity of the on-site containment cell proposed in the FS.

It is clear, then, that the material and methods of constructing liner and leachate collection systems are available and have been designed, approved and constructed to meet specifications equal to and exceeding the technical requirements of the PADER residual waste landfill regulations. The on-site containment cell proposed in Remedial Alternative VI will include the design and use of liner and leachate collection system materials and methods of construction that will comply with the PADER residual waste landfill regulations. Information on liner and leachate collection systems is presented here as an example of the type of materials and methods that would be considered during final design for use in constructing the on-site containment cell.

Liner System Design

The regulations require that plans, cross-sections and specifications for a liner and leachate collection zone be provided. This is primarily final design information that will only be developed after the remedy has been approved by the USEPA. The USEPA guidance manual Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (OSWER Directive 9355.3-01, Section 6.2.1) states that the information to be developed in an FS which would form the basis of the remedy selection process in a ROD should consist of preliminary design calculations, process flow diagrams, sizing of key process components, preliminary site layouts, and a discussion of limitations, assumptions, and uncertainties concerning each alternative.

Consequently, final design information such as drawings and specifications are not necessary to select a remedy in a ROD. However, the FS for the Site defined a number of these items in detail. This information is summarized below. Additional information on liner and leachate collection system materials and methods of construction to be considered for use in designing the on-site containment cell is also provided below. This conceptual design information may be revised during final design. The liner materials and methods of construction may be modified from those presented here. These modifications would be presented in the final design. If the final design differs from the requirements outlined in the regulations, technical information supporting the alternate design will be provided and submitted to USEPA and PADER in accordance with the equivalency review procedures defined in § 287.231.

As previously described, two areas of the Site were considered in the FS for use as the location of the proposed on-site containment cell: the shale pit and the northeast area. Concept design information was presented in Section 4.9.1 (e) of the FS regarding the construction of the liner system that would be used for construction of the cell in each of these locations. This information was summarized on Figure 4-7 of the FS, included in this report as Appendix 11A. The regulations and Form 16R require that design information addressing the following six key elements of the liner system be provided:

- thickness and characteristics of subbase;
- thickness and characteristics of leachate detection system;
- design for leachate monitoring;
- nature and thickness of liner materials;
- thickness and characteristics of protective cover and leachate collection zone; and,
- design of leachate collection system.

The regulations and Form 16R essentially describe requirements for five separate zones comprising a liner system. The figure presented in the FS depicted the conceptual design of the liner system to be used in the on-site containment cell has been modified for this submission to identify the components of the liner system in terms of these five zones and to address the recently promulgated PADER residual waste regulations. The modified conceptual liner design is shown on the figure included in Appendix 11B of this report. The figure shows a graphical representation of the components of the liner system, the individual zone which the components represent, a description of the materials of construction and the specific section of the regulations which define the requirements for each zone. The zones identified in the regulations and shown on the figure, described from the top to the bottom of the liner, are as follows:

- the leachate collection zone within the protective cover;
- the primary liner;
- the leachate detection zone;
- the secondary liner; and
- the subbase.

The figure also shows a ground water drainage layer to be included at the bottom of the shale pit area subbase as a protective measure. Although not needed to meet the minimum vertical distance from the top of the subbase to the regional or seasonal high ground water table, discussed in Section 3.1.16 with respect to § 288.432, this ground water drainage layer would be included in the on-site containment cell liner design for the shale pit area as an added protective measure.

The remainder of this section is organized to address the six key elements of the liner system as they are presented in the regulations (listed earlier in this section) and on Form 16R (e.g. thickness and characteristics of subbase, etc.).

The requirements for the material to be used as a subbase are specified in the PADER regulations at § 288.433, Subbase. The regulations require that subbase material meet the following performance standards:

- Bear the weight of the liner, waste, final cover and operating equipment without causing liner system failure.
- Accommodate settlement.
- Be a barrier to liquids.
- Consist of an upper six inches that is:
  - (i) compacted (proctor density of at least 95 percent);
  - (ii) no more permeable than 1.0×10^{-5} cm/sec;
  - (iii) Be hard, uniform, smooth and free of rocks, debris, plant material, etc.
- Have a minimum bearing capacity of 4,500 pounds per square foot plus the total applied load.
- Have a post-settlement slope of at least two percent and no more than 25 percent.

This is detailed information that will be defined in the final design and selection of materials to be used for subbase materials. Subbase materials that comply with these regulations will be specified for use in the on-site containment cell. The final design will also locate and test on-site and/or off-site sources of acceptable subbase material that would be used during construction.

The amount of subbase material to be placed in either the shale pit or the northeast area depends on the depth to ground water. As discussed in Section 3.1.16, § 288.432 specifies minimum distances from the top of the subbase to the seasonal high and the regional ground water table. Section 3.1.16 also discusses how the bottom of the proposed subbase for the northeast cell would comply with these minimum ground water separation distance requirements. As a result, the thickness of the subbase for the northeast cell would be a minimum of six inches.

The bottom of the proposed subbase for the shale pit cell, however, would not comply with the minimum ground water separation distance requirements. As a result, the thickness of the subbase would be increased from the minimum six inches to a thickness of approximately 8 feet. This would raise the elevation of the bottom of the cell prior to liner installation from the present shale pit elevation of approximately 1642 to approximately 1650 feet. At this elevation, the top of the subbase would be at least four feet higher than the seasonal high water table and at least eight feet higher than the top of the confining layer or the shallowest level below the bottom of the subbase where ground water occurs. The hydrogeologic conditions defining the high seasonal ground water table, the confining layer and the regional ground water table in the shale pit area are described in Section 3.1.16.

The requirements for the design of the leachate detection zone are defined in § 288.435. The key requirements are as follows:

- Be at least 12 inches thick.
- Contain a perforated piping system with a minimum pipe diameter of four inches.
- Create a flow zone with a permeability not less than 1.0×10^{-2} cm/sec.

The concept design presented in the FS (see Appendix 11A) proposed the use of a one foot thick drainage layer to comply with these requirements. Not shown in the figure (Appendix 11A) or described in the FS is the piping system that would be installed in the on-site containment cell leachate detection zone. The modified conceptual design of the liner system shown in Appendix 11B contains a 12 inch thick leachate detection zone beneath the primary liner. This zone would be designed to include a system of four inch diameter perforated pipes. This piping system would be defined during final design and would be designed to comply with the specifications stipulated in § 288.435 (b) (4) and (5). As discussed in Section 4.9.1 (e) of the FS, this leachate detection zone would be connected to a manhole (sump) to be used to collect and monitor the presence of leachate. Additional information on the drainage layer demonstrating compliance with these regulations would be developed during final design. The leachate detection zone in the on-site containment cell in either the shale pit or the northeast area, including piping, collection manhole and permeable soil, would be designed to comply with the requirements defined in § 288.435.

Leachate monitoring was described in Section 4.9.1 (e) of the FS. The FS explained that separate manholes would be connected to the leachate collection zone within the protective cover and to the leachate detection zone. The manhole connected to the leachate collection zone would be used to inspect, and if necessary, collect leachate which accumulates above the primary liner in the on-site containment cell. The level of leachate in this manhole would be checked periodically. Accumulated leachate would be tested and pumped from this manhole for appropriate treatment and disposal (see Section 3.1.17). Leachate collection is only anticipated to be required while the on-site containment cell is open and for a short time after closure.

During construction, leachate in the leachate collection zone manholes will be monitored, tested and removed for appropriate disposal. The manhole connected to the leachate detection zone beneath the primary liner will also be monitored for leachate. The presence of leachate in this manhole could indicate a potential problem in the primary liner. If leachate is detected in the leachate detection zone manhole, appropriate remedial measures, such as the repair or replacement of the primary liner, will be taken.

After the final cover has been installed and the on-site containment cell is closed, both leachate collection and leachate detection manholes will be monitored for the presence of leachate. Leachate from the leachate collection manhole will be tested and removed for appropriate disposal. If leachate is detected in the leachate detection manhole, appropriate remedial measures, such as the repair or replacement of the final cover, will be taken.

The next element of the liner system identified in the regulations is the nature and thickness of liner material to be used in the primary and secondary liner systems. The regulations require that these liners have a permeability of 1.0×10^{-7} cm/sec or less, be resistant to chemicals in waste and/or leachate and, if a synthetic liner is used, be installed by or under the supervision of an authorized representative of the manufacturer. As shown in Appendix 11B, the modified conceptual liner design would include the use of 60 mil HDPE (or equivalent) in both the primary and secondary liners. The secondary liner would also contain a layer of bentonite attached to the secondary liner. This combination of bentonite and synthetic liner material complies with the composite liner requirement identified in the regulations for either the primary or the secondary liner system.

The regulations require that the thickness and characteristics of the protective cover and the leachate collection zone be provided. The protective cover is used to protect the primary liner from damage during the placement of the initial lift of waste in a cell. The regulations require that this zone have a permeability of 1.0×10^{-2} cm/sec or greater, be at least 18 inches thick and protect the leachate collection system and protective cover.

The regulations require that the leachate collection system to be installed within the protective cover be constructed of the aggregates (stones) used in the protective cover and a piping network consisting of six inch diameter perforated pipes. The protective cover and the leachate collection system shown in the modified liner design for the on-site containment cell will be designed to comply with the requirements contained in the regulations at § 288.437 (Protective Cover) and at § 288.438 (Leachate Collection System Within Protective Cover).

The manhole connected to the leachate collection zone, described earlier, will be designed to automatically monitor the amount of leachate collected. A pump will be installed in the manhole to transfer accumulated leachate to an above ground storage tank. This tank will be designed with secondary containment and automatic overflow controls. The actual components of the protective cover and leachate collection zone would be selected during final design.

Liner Installation Plan

The regulations require that a plan to install the liner be provided. The plan should describe the following:

- A quality assurance and quality control plan for the installation of the liner, including the following:
  - **a.** a description of the liner testing procedures and construction methods;
  - **b.** methods to maintain and protect the protective cover and liner system in unfilled portions of cell prior to and during placement of the initial lift of waste;
  - **c.** methods to protect the protective cover and liner system from weather in unfilled portions of cell prior to and during placement of the initial lift of waste;

d. the qualifications of the quality assurance and quality control personnel;

e. a liner sampling plan; and

f. the method in which quality assurance and quality control will be documented.

- Information that demonstrates that leachate will not adversely affect the liner system.
- A complete description of the physical, chemical, mechanical and thermal properties for the proposed primary and secondary liners. The regulations list eighteen (18) properties for which information is required.

All of this information will depend on the liner materials and methods of construction to be selected during final design. Although the actual liner material to be installed would not be selected until final design, the materials and methods to be used would be equivalent in performance to the liner materials identified in the modified conceptual liner design (Appendix 11B).

In order to provide information with which the adequacy of the modified conceptual liner design can be evaluated, example information from one manufacturer of synthetic liner material has been included in this report. If other liner materials and construction methods are selected, information similar to that provided here would be submitted to the USEPA as part of the final design.

The focus of the liner installation plan, as defined in the regulations, is a quality assurance and quality control plan. This plan is to describe testing procedures, installation methods, liner sampling and quality assurance and quality control documentation. A sample liner quality assurance and quality control plan has been prepared by one synthetic liner manufacturer, Gundle Lining Systems, Inc., that addresses most of these requirements. A copy of this plan has been included in this report as Appendix 11C.

Similarly, information on the technical specifications, including installation methods, has been included for the synthetic liner materials (i.e., HDPE) and for the composite liner materials (i.e., HDPE and bentonite) used in the modified conceptual liner design. This information, from Gundle Lining Systems, Inc., is included as Appendix 11D (synthetic liner material) and in Appendix 11E (composite liner materials). As previously stated, if the actual liner materials and construction methods selected during final design differ from that identified in the modified conceptual liner design, installation methods and quality assurance and quality control procedures pertaining to the material selected during final design would be submitted to the USEPA for review and approval.

The regulations and Form 16R also require that a description of the physical, chemical, mechanical and thermal properties for the proposed primary and secondary liner be provided. As previously stated, the actual liner material to be used in the on-site containment cell would be identified during final design. An example of the type of liner material considered during the preparation of the FS and in the development of the modified conceptual liner design (Appendix 11B) is included in this report. Appendix 11F contains a description of the synthetic HDPE liner material manufactured by Gundle Lining Systems, Inc. This material is equal to the material considered for use in the FS and the modified conceptual liner design shown in Appendix 11B for the primary liner. Appendix 11G contains a description of the physical properties of the bentonite and HDPE composite liner material manufactured by Gundle Lining Systems, Inc. This material is equal to the material considered for use in the modified conceptual liner design shown in Appendix 11B for the secondary liner.

The regulations also require that liner material be tested for compatibility with waste material. The waste material to be placed in the on-site containment cell is stabilized Site material. The composition of this material is known, based on information developed during the RI and the Stabilization Treatability Study. When the liner materials to be used are selected during the final design, they will be tested for compatibility with stabilized Site material. The compatibility testing procedures to be used are those defined in USEPA Method 9090 (Compatibility Testing for Waste and Membrane Liners). Table 7-6 of the USEPA guidance manual Handbook: Remedial Action at Waste Disposal Sites (Revised) (EPA/625/6-85/006) states that HDPE displays good resistance to oils and chemicals, weathering and high temperatures.

3.1.14 § 288.422 Areas Where Class I Residual Waste Landfills Are Prohibited

This section of the PA Residual Waste Management Regulations sets forth what are referred to as "Oh Criteria" These items are relied upon by PADER in making decisions regarding the suitability of a location for a residual waste landfill. There are 12 specific items which are part of this section of the regulations which address geographic or physical features of the proposed location as a means of assessing potential impact to the public or the environment. These 12 items, along with there subsections, are described in the following evaluation.

3.1.14.1 Evaluation

The PADER Form which applies to this section of the PA Residual Waste Management Regulations is Form D. A completed copy of this form is contained in Appendix 12. This evaluation corresponds to the individual sections of the regulations as well as the information request in Form D.

100 Year Floodplain

The entire Site is outside the 100-year floodplain. Appendix 12A contains a portion of the floodplain map from Foster Township which shows the relationship of the Site to the 100-year floodplain.

Within 300 Feet of an Exceptional Value Wetland

Exceptional value wetlands are defined in Title 25 of the Pennsylvania Code , Environmental Resources, Chapter 105 § 105.17. Based on a review of the definition of exceptional value wetlands, it can be concluded that;

> 1) there are no wetlands at the Site within 300 feet of either of the proposed on-site containment cells which serve as a habitat for threatened or endangered species (see section *3.1.1.1 Evaluation,* Wetlands).
>
> 2) there are no wetlands at the Site within 300 feet of either of the proposed on-site containment cells which are hydraulically connected to or located within one-half mile of other wetlands which serve as a habitat for threatened or endangered species (see Plate 1, section *3.1.1.1 Evaluation,* Wetlands, and the National Wetlands Inventory Map in Appendix 1D).
>
> 3) there are no wetlands at the Site within 300 feet of either of the proposed on-site containment cells which are located in or along the floodplain of a reach of the wild trout stream or waters listed as exceptional value under chapter 93 (see section *3.1.1.1 Evaluation,* Special Protection Watersheds). Sandy Run Drainage basin is not classified as exceptional value. Additionally, there are no wetlands at the Site within 300 feet of either of the proposed on-site containment cells which are located within the corridor of a water

course or body of water that has been designated as a National wild or scenic river.

4) there are no wetlands at the Site within 300 feet of either of the proposed on-site containment cells which are located along a public or private drinking water source (see Plate 1 and 2).

5) there are no wetlands at the Site within 300 feet of either of the proposed on-site containment cells which are within an area designated as "natural" or "wild" areas within State forest or park lands, Federal wilderness areas or National natural landmarks (see section *3.1.1.1 Evaluation,* Recreational River Corridors and State and Federal Forests and Parks and Appalachian Trail).

Within 100 feet of a Wetland Other than an Exceptional Value Wetland

As shown on Plate 1 and the National Wetlands Inventory Map and discussed in the Expanded Wetlands Survey contained in Appendix 1D, there were no wetlands located within 100 feet of either of the proposed on-site containment cells.

Coal Bearing Areas Underlain By Recoverable Coal

As discussed in section *3.1.1.1 Evaluation*, Inactive Wells, Mines, etc. within One-quarter Mile and *section 3.1.12 Mineral Deposits Information*, the Site is not underlain by recoverable coal. There are inactive coal mines in the area, but these deposits do not immediately underlie the Site. Figures illustrating the regional subsurface regional geology are contained in Appendix 5A and Appendix 6A.

Potential to Eliminate, Pollute and/or Destroy a Perennial Stream

The surface water body which drains the Site, including the two areas where an on-site containment cell may be constructed, is Mill Hopper Creek. This surface water body is seasonal, not perennial.

The construction of an on-site containment cell at either of the two locations would not eliminate or destroy Mill Hopper Creek. Furthermore, once the stabilized materials are place in the lined containment cell and an impermeable cover is placed over the material, the closed cell will not result in the contamination of surface water. In fact, storm water controls will be incorporated into the design of the on-site containment cell to convey storm water around the cover of the cell and into Mill Hopper Creek.

Presence of Limestone or Carbonate Formations in Upper Geologic Unit

The regional and Site geology is discussed in *section 3.1.7 Geology and Groundwater Description*. Also, specific information from the RI Report is reproduced in Appendix 6A and 6B. This data confirms that the region and Site are not underlain by limestone or carbonate formations.

Furthermore, neither limestone or carbonate formations have been mapped at the Site by the PA Geological Survey. A copy of the portion of the Pennsylvania geologic map is contained in Appendix 5D.

Within 300 Feet of an Occupied Dwelling

As indicated on PADER Form D, the two possible locations for an on-site containment cell are not within 300 feet of an occupied dwelling. Plate 2, shows the nearest occupied dwelling to be greater than 300 feet from the western edge of the on-site containment cell located in the shale pit which occupies an area that represents the maximum volume capacity design for stabilized materials described in the FS Report.

The 300 foot radius surrounding the possible on-site containment cell in the northeastern portion of the Site extends onto Hickory Hill property. However, there are no constructed, let alone occupied dwellings, within this radius.

<u>**Within 100 Feet of a Perennial Stream**</u>

Plate 2 shows that the 100 foot radii around the two possible on-site containment cell locations, which are sized for the maximum volume capacity, do not encompass a perennial stream. In fact, the nearest surface water body is Mill Hopper Creek, which exhibits only seasonal flow.

<u>**Within 100 Feet of a Property Line**</u>

The locations of the two proposed on-site containment cells shown in Plate 2, which are sized for the maximum volume capacity, are positioned 100 feet from the Site property boundary. There is also space to shift either proposed cell further from the existing property line if it becomes necessary.

<u>**Within 25 Feet of a Coal Seam, Coal Outcrop or Coal Refuse**</u>

The were no coal seams, outcrops exhibiting coal or coal refuse piles observed within 25 feet of either of the two proposed locations for an on-site containment cell.

Within One-Quarter Mile Upgradient and Within 300 Feet Downgradient of a Public or Private Water Source

The two proposed on-site containment cells are not within one-quarter mile upgradient of the potable supply wells in the area (see Plate 1). Additionally, the two proposed on-site containment cells, which are sized for the maximum volume capacity, are not within 300 feet downgradient of potable supply.

The direction of ground water flow in the shale pit area is southerly. (The direction of ground water flow is illustrated on figures contained in Appendix 6D). Hence, the potential on-site containment cell at this location is not one-quarter mile upgradient of these potable supply. Furthermore, the nearest residential well is greater than 300 feet from the boundary of the proposed on-site containment cell in the shale pit. Therefore, to the extent this residence is upgradient, this criteria would be met. A copy of a sketch map, prepared as part of a water distribution inventory during the RI, which shows the proximity of this residential well on the property is provided in Appendix 12B.

Receipt of Putrescible Waste

The stabilized materials that will be placed in the on-site containment cell are not putrescible waste (see *section 3.2.1 Chemical Analysis of Waste*).

The remaining portions of *§ 288.422* of the PA Residual Waste Management Regulations pertain to captive facilities which were either permitted prior to July 4, 1992 or those facilities which the Department determined had an administratively complete application by July 4,1992. In such circumstances, certain waivers and/or modifications to the aforementioned oh criteria may be applicable.

There is additional information requested in PADER Form D. The additional information requests are contained in section two of Form D which is titled Environmental Assessment Criteria. Section two of Form D is composed of two parts. Part One of section two of Form D evaluates potential impacts by the facility on the environment and the public. Part Two of section two in Form D requests information on the economic and social considerations. Since the Site is a listed hazardous waste site, the the social and economic considerations of one part of the entire remedy are not substantive aspects of the ARARs. In practical terms, the planned remediation of the Site will likely improve the economic and social environment in the area of the Site. Hence, the following narrative focuses on Part One of section two in Form D.

Part one of section two of the PADER Form D is separated into an A and B segment. The A segment requests an analysis of the potential impact of a proposed facility on the environment, public health, and public safety, including: traffic; aesthetics, air quality stream flow, fish and wild life, plants and aquatic habitat; threatened or endangered species; water uses; and, land use. The B segment portion of Form D, section two, part one, asks a series of 17 questions which relate to the general environmental setting in which the proposed facility will be constructed.

The items identified in segment A of PADER Form D, section two, part one, are exactly the same as those identified in *§ 288.127* of the PA Residual Waste Management Regulations. A detailed description for each of these items was already provided in the evaluation portion of section 3.1.1 Environmental Assessment. Therefore, please refer to that section for an analysis of potential impacts to these various areas which relate to an on-site containment cell at the Site.

The 17 questions contained in segment B of PADER Form D, section two, part one, expanded upon some of the information requests which were discussed in section *3.1.1 Environmental Assessment*. Therefore, the " Yes/No " box for each of these questions is completed in Form D (see Appendix 12). In addition, a response to these 17 questions is provided below.

Question # 1

As previously mentioned, Mill Hopper Creek, which drains the Site, flows into Sandy Run Creek. Sandy Run eventually drains into the Lehigh River. The Lehigh River at the Luzerne/Carbon County line is an approved scenic river. Sandy Run enters the Lehigh River at a point downstream of the border of these two counties. Although it is not clear what defines a "corridor" of river, the Mill Hopper Creek-Sandy Run Creek-Lehigh River surface drainage connection may be interpreted to be a "corridor" of a scenic river. Hence, the location of two possible on-site containment cells would be within this corridor.

However, the circumstances surrounding construction of an on-site containment cell at the Site would not adversely impact surface waters downstream of the units (see evaluation portion of section *3.1.1 Environmental Assessment*, Potential Impacts to Air and water Quality and Stream Flow, and section *3.1.10 Surface Water Information* which describes the current water quality at the Site and immediately downstream).

Question # 2

As stated in the evaluation portion of section *3.1.1 Environmental Assessment*, Recreational River Corridors, there are no rivers designated IA in Luzerne County. Furthermore, according to Terry Hoke, (Environmental Planner, PADER Scenic Rivers Program) there are no rivers in Luzerne County under study or slated for entry into the National Wild and Scenic Rivers System.

Question # 3

Based on the State's Official Transportation Map (see Appendix 1B), there are no units of the National or State Park System within one mile of the Site. Also, there are no State picnic areas within one mile of the Site (see the evaluation portion of section *3.1.1 Environmental Assessment*, State and Federal Forests and Parks and Appalachian Trail). The Recreational Department at the Luzerne County Courthouse indicates that the only county park is Moon Lake Park in Hemlock Creek. This is greater than one mile from the Site. Likewise, recreational areas which the US Army Corps of Engineers have authority over are greater than one mile from the Site (Francis E. Walter Dam, located just north of Exit 35 of the PA Turnpike Extension, on the Lehigh River; and, Beltzville Lake at Exit 35 of the PA Turnpike Extension).

The Allegheny National Forest is located in Elk County in the northwestern corner of the State, significantly more than one mile from the Site.

Question # 4

As mentioned in the evaluation portion of section *3.1.1 Environmental Assessment*, State and Federal Forests and Parks and Appalachian Trail, the Appalachian Trail is in excess of 15 miles from the Site.

Question # 5

According to the US National Park Service, there are no National Natural Landmarks within one mile of the Site. Additionally, according to the PA Environmental Quality Board, Division of Forestry and PADER Bureau of Forestry, Division of Forest Advisory Services, there are no designated natural areas or wild areas within one mile of the Site.

Question # 6

The US Fish and Wildlife Service indicate that there is no wildlife refuge, national fish hatchery or national environmental center within one mile of the Site. In fact, none of the facilities which were identified by this department are in Luzerne County or the adjacent Carbon County. Hence, the proposed on-site containment cell at the Site would not be in a potential impact area of such a facility.

Question # 7

As part of the RI/FS Report entitled, A Phase 1A Archeological Survey of the C&D Recycling Property, Foster Township, Luzerne County, Pennsylvania, a background literature review was conducted and included records at the PA State Museum (see the evaluation portion of section *3.1.1 Environmental Assessment*, Historic and Archeological Sites). This review did not identify any historic properties owned by the PA State Museum within one mile of the Site.

Question # 8

The nearest property to the Site which is listed in the National Register of Historic Places is the Eckley Miners' Village. This registered location is in excess of two miles from the Site. An opinion of eligibility for inclusion in the National Register was submitted by the State Historic Preservation Officer for a bridge southwest of the project area. However, this bridge is approximately one and one-half miles from the Site.

Question # 9

Most of these items were already covered in Question #3 for a distance of one mile from the Site. Since there are no State forest lands or proclamation boundary of the Allegheny National Forest within one-mile of the Site, it follows these areas do not exist within one-quarter mile. Similarly, there are no State Game Lands within one-quarter mile of the Site (see the evaluation portion of section *3.1.1 Environmental Assessment*, State and Federal Forests and Parks and Appalachian Trail).

Question # 10

There were no habitats of rare, threatened or endangered species of plant or animal identified during the ecological survey conducted at the Site. Similarly, the PA Natural Diversity Inventory (PNDI) has no record of special concerns in this area (see the evaluation portion of section *3.1.1 Environmental Assessment*, Potential Impacts to Terrestrial and Aquatic Flora and Fauna).

Question # 11

The soil type at the Site is classified as cut and fill and/or Oquaga and Lordstown channery silt loams. In the area of the shale pit, cut and fill is the appropriate soil type designation. Hence, the area of the shale pit does not exhibit soil types of the class I or II variety.

Conversely, the soil type in the area in the northeastern portion of the Site is likely Oquaga Lordstown channery silt loams. The surface topography in the northeastern portion of the Site indicates slopes greater than 10 percent. As indicated in Appendix, the capability subclass of this type of soil at this slope is IIIe.

Hence, the soil types at both possible locations for an on-site containment cell are not prime farmland (see the evaluation portion of section *3.1.1 Environmental Assessment*, National Wildlife Refuges and Prime Farmland).

Question # 12

As discussed in the evaluation portion of section *3.1.1 Environmental Assessment*, Special Protection watersheds, the Site lies within the Sandy Run Drainage Basin which is designated a High Quality Cold-Water Fishery. Since the entire basin carries this designation, and because Mill Hopper Creek drains to Sandy Run Creek, storm water from the Site will enter this watershed.

Based on the existing data and conditions at the Site, the placement of stabilized materials in an on-site containment cell will not adversely impact the water shed. This is because surface water runoff during the construction of on-site containment cell will pose less of a potential impact than the excavation and stabilization activities of the planned remedy. The planned surface water controls which will be implemented during the remedy will provide the necessary protection to the watershed during additional regrading or excavation activities associated with construction of an on-site containment cell.

After the containment cell is closed a leachate collection system will ensure further protection of the watershed while storm water controls will convey storm water around the cover. These measures will be subsidized by post-remedy surface quality monitoring which is required even if the stabilized materials are removed off-site for disposal. Consequently, once the on-site containment cell is closed, which will occur approximately 12 months from the time construction begins, the potential for future impacts to surface water are extremely remote.

Question # 13

The construction of an on-site containment cell and maintenance after closure will not result in increased peak discharge rates for storm water.

Storm water controls will be necessary as part of remediation activities associated with the excavation of soil and sediment from the Pond. These same controls will be designed to manage storm water flow for the short-term period of cell construction.

A storm water collection system will be incorporated into the design of the on-site containment cell. The basic components of the storm water collection system were described in section 4.9.1 (e) of the FS Report. These controls will be designed to maintain the current peak flow storm water discharges from the on-site containment cell (eg. by terracing diversion ditches) after the cover is placed on the unit.

Question # 14

The issue of traffic associated with the on-site containment cell is discussed in the evaluation section of section *3.1.1 Environmental Assessment*, Aesthetics and Potential Impacts Resulting from Traffic. the excavation and stabilization of contaminated materials will increase the traffic in the area. A further increase in traffic will result if the stabilized materials are brought off-site for disposal. This is because over 2,000 more trucks, than would be required by construction of an on-site containment cell at the Site, would be needed for transport. Hence, construction of an on-site containment cell eliminates the likelihood of excess traffic accidents and possible associated with off-site transportation.

Question # 15

The Site is located in a watershed and aquifer which provides both private (residential well) water and public water. As indicated in the evaluation portion of section *3.1.1.1 Environmental Assessment*, Water and Land Use, the closest water supply which may constitute as a public supply is the Maple Lane Trailer Park. The water supply at the trailer park is within one mile of the Site but is part of the Pond Creek Drainage Basin and hydraulically upgradient of the Site. The White Haven Water Authority maintains an emergency surface water reservoir within three miles of the Site. This reservoir is within three miles northeast of the Site. It is also in the Pond Creek Drainage Basin hydraulically upgradient.

Based on the existing data, the placement of stabilized materials in the on-site containment cell will not adversely impact surface or ground water. The technical basis for this conclusion has been previously detailed in the evaluation portion of section *3.1.1 Environmental Assessment* . Also, the evaluation portion of section *3.1.11 Alternative Water Supply* presents a detailed analysis of the existing water quality conditions, potential future impacts on the water supply and the reason mitigation measures, beyond compliance monitoring, are not necessary.

Question # 16

There is no report for Luzerne County regarding the potential for landslides, sinkhole and/or mine subsidence. However, since there are no mines underlying the Site, there is no potential for mine subsidence.

The potential for sinkhole to develop is also remote given the composition of the bedrock unit beneath the Site. As previously discussed, the Mauch Chunk Formation is the geologic unit underlying the Site and the adjacent area. This formation is characterized as shale, siltstone and fine to coarse grained sandstone. The boring logs, core logs and geophysical logs (see Appendix 6B) all indicate that the rock beneath the Site is fairly competent, and not the type to which would be subject to sinkhole development.

The risk of landslide is also remote since there is only a thin soil cover overlying the competent rock at most of the Site. At the two proposed locations for an on-site containment cell, landslide risks are even less remote after construction. At the shale pit location, an existing depression will be partially filled while if the area in the northeast portion of the Site is selected, the cell will be constructed after excavating into the upper rock layer.

Question # 17

The wetlands which are present at the Site and adjacent area are discussed in the evaluation portion of section *Environmental Assessment*, Wetlands. Essentially, the wetlands closest to the Site are immediately adjacent to Mill Hopper Creek (0.5 to 1 foot of the edge of the creek) and the Pond, located south of the Site. The ecological significance of these wetlands are also discussed in this section and in the evaluation portion of section *3.1.1. Environmental Assessment*, Potential Impacts to Terrestrial and Aquatic Flora and Fauna.

3.1.15 § 288.423 Minimum Requirements for Acceptable Waste

This section of the regulations prohibits the disposal of the following waste in a residual waste landfill:

- waste that is incompatible with the liner system;
- leachate from the waste is adequately treated;
- waste may not interact with other waste such as to affect the liner system;
- bulk liquid waste;
- waste may not interact with other waste such as to endanger public health, safety and welfare or the environment;
- municipal or special handling waste;
- RCRA hazardous waste (unless permitted by PADER); and
- TSCA waste.

3.1.15.1 *Evaluation*

The following evaluation addresses the items referred to in this section of the regulations. The information required by this section of the regulations is also outlined in a specific form contained in the PADER Industrial Waste Landfill Permit Application. The form is designated as Form R. This form requests a narrative response and, as a result, the form has not been reproduced for this report. This section, in addition to Sections 3.1.2.1 (Chemical Analysis of Waste) and 3.1.3.1 (Waste Analysis Plan), contain the majority of the information requested in Form R. This evaluation addresses each of the waste prohibitions listed above.

Waste and Liner Compatibility

The regulations prohibit waste or leachate that is not compatible with the liner material to be used to construct the on-site containment cell. As discussed in Section 3.1.13.1, the liner material to be used will be selected during final design. A conceptual design of the liner system described in Section 3.1.13.1 and presented in Appendix 11B identified HDPE and bentonite as two of the materials to be used in the construction of the liner.

As discussed in Section 3.1.2.1 (Waste Generation), the only waste which Remedial Alternative VI stated would be placed in the on-site containment cell is the stabilized soil, ash and sediment from the Site. The characteristics of stabilized Site material will depend on the characteristics of the waste to be stabilized (i.e., soil, ash and sediment) and the chemical agents to be used to stabilized this material. The composition of soil, ash and sediment has been thoroughly addressed in the RI, as discussed in Section 3.1.2.1. The composition of the stabilized material would depend on the selection during final design of the stabilization agents to be used. As discussed in Section 3.1.2.1, a Stabilization Treatability Study has identified portland cement and a proprietary agent, IWT, as two possible stabilization agents for use at the Site.

Since final selection of the liner materials and the stabilization agents will be completed during final design, compatibility testing of these materials is not possible at this time. However, the final design will include testing to determine the compatibility of the liner material to be used in construction and the final stabilization agent/waste mixture. The compatibility of liner materials with the leachate from stabilized Site materials will also be tested. As described in Section 3.1.13.1, the compatibility testing defined in the most recent edition of USEPA Method 9090 will be used to test liner and waste/leachate compatibility.

Based on the existing information regarding the liner materials that would probably be used (see Appendix 11B) and the stabilization agent/waste mixture (i.e., portland cement; see Stabilization Treatability Study), it is likely that the waste to be placed in the on-site containment cell would be compatible with the liner material to be selected during final design.

Generally, Site material primarily contains inorganic constituents, mostly lead. The addition of portland cement primarily serves to raise the pH of the mixture, forming insoluble and immobile metal hydroxides. This material is compatible with the HDPE and the bentonite materials considered for use in constructing the liner. The pH of the leachate would not impact the integrity of the HDPE, bentonite, stone or pipes (e.g., corrugated metal or PVC) materials considered for use in the modified conceptual liner design for use in constructing the on-site containment cell.

Leachate Treatment

The regulations prohibit waste from placement in a cell unless the leachate is adequately treated. Leachate treatment is described in Section 3.1.17.1.

The leachate treatment process proposed in the FS for Remedial Alternative VI is off-site transportation, treatment and disposal. Although this section of the regulations requires that either on-site treatment or off-site transportation and disposal to a permitted publicly owned treatment works be used to treat and dispose leachate, § 288.453 provides that off-site treatment and disposal is permitted for the first three years following initial discharge of leachate in the leachate collection and handling system.

The on-site containment cell proposed in Remedial alternative VI would be constructed and closed within one year. It is unlikely that any significant amount of leachate would be generated after closure. The on-site containment cell would be constructed with a low permeable cover which would prevent the infiltration of precipitation into the waste and leachate collection system. Furthermore, the stabilized materials would probably contain stabilization agents that are hygroscopic. As a result, very little precipitation, if any, would enter the waste material and, due to the probable chemical characteristics of the waste, even less water would be able to leach through to the leachate collection system.

As discussed in Section 3.1.17.1, the requirement to use on-site treatment, then, is not applicable to conditions at the Site. Since the on-site containment cell would be closed well within the three year off-site treatment period, the regulations contained in § 288.452, which pertain to operating facilities, are not applicable. Instead, the requirements stipulated in § 288.182 and in § 288.292 regarding closure would be relevant and appropriate since closure of the on-site containment cell would occur approximately one to two years before the end of the three period when off-site leachate disposal is allowable. These closure regulations require that a closure plan describing the measures selected for leachate collection and treatment be provided. The final design plans for the on-site containment cell will describe the off-site treatment methods to be used during construction and the long-term maintenance plan (i.e., operation and maintenance plan) will describe the methods of monitoring for and treating collected leachate. This plan will identify collection, transportation and treatment of collected leachate as well as the leachate treatment methods to be used after closure.

Waste Interaction

The regulations prohibit waste that would react, combine or interact with other waste to be disposed at the facility in a manner that could affect the integrity of the liner system or to endanger public health, safety or welfare or the environment. As discussed in Sections 3.1.2.1 and 3.1.3.1, the waste to be placed in the on-site containment cell is stabilized Site material. The testing to be performed to monitor the performance of the stabilization process would also serve as the sampling to be performed in accordance with the Waste Analysis Plan described in Section 3.1.3.1. The physical properties and chemical composition of the waste, stabilized Site material, is unlikely to vary to any measurable degree. The raw materials for the process (i.e., soil, ash, sediment and stabilization agent) are similar in chemical concentration and the addition of stabilization agents would result in a material with relatively similar physical properties.

Bulk Liquids

The regulations prohibit the disposal of bulk liquids in a residual waste landfill. No bulk liquids will be placed in the on-site containment cell. As previously stated, Remedial Alternative VI includes the placement of stabilized soil, ash and sediment in the on-site containment cell. The stabilized material would be tested using the Paint Filter Test to ensure that not even free liquids would be present.

Municipal or Special Handling Waste, RCRA or TSCA Waste

The regulations prohibit municipal or special handling waste, RCRA waste or TSCA waste from disposal in a residual waste landfill facility. As previously described, only stabilized Site material would be placed in the on-site containment cell. No municipal or special handling waste, RCRA or TSCA waste would be included in the material to be placed in the on-site containment cell. As discussed in Section 3.1.2.1 (Hazardous Waste Determination), the USEPA has concluded that Site material is RCRA characteristic hazardous waste and that once the soil, ash and sediment is stabilized, the hazardous waste characteristic would be removed and the waste would no longer be hazardous pursuant to RCRA.

Finally, no concentrations of PCBs in excess of 50 ppm were detected in any soil, ash or other sample collected from the Site or from adjacent off-site areas during the RI. As a result, the disposal limitations stipulated in TSCA do not apply to placement of stabilized Site material in the on-site containment cell.

3.1.16 § 288.432 General Limitations

This section of the regulations defines the following general requirements:

1. Ground Water Isolation Distance Requirements. The regulations require that minimum distances between the subbase and the regional and seasonal high ground water table be maintained.

2. Liner and Waste Location Requirements. The regulations require that minimum distances be maintained between the edge of the liner and the waste, that a berm be constructed and that the edge of the liner be marked.

3.1.16.1 Evaluation

The following evaluation addresses the items referred to in this section of the regulations. Specific information supporting this evaluation, some of which was already completed as part of the RI/FS, is identified and included as an appendix to this report.

<u>**Ground Water Isolation Distance Requirements**</u>

The regulations require that the following minimum vertical distances be maintained between the subbase and ground water:

1. At least four feet shall be maintained as a minimum isolation distance between the top of the subbase of the liner system and the seasonal high water table without the use of pumping. A drainage system may be used to meet this four foot isolation distance.

2. For confined aquifers, at least eight feet should be maintained between the top of the subbase of the liner system and one of the following:

  a) the top of the confining layer; or

  b) the shallowest level below the bottom of the subbase where ground water occurs as a result of leakage from natural or other preexisting causes.

The depth to ground water beneath the Site varies as a result of the changing topography. This is illustrated in Figure 3-26 of the RI Report (see Appendix 6D). The changing topography causes the depth of the seasonal high ground water level in the northern part of the Site to range from approximately 30 to 60 feet below grade (based on highest water level measurements at MW-7S and MW-8S). As ground water flows southerly, the land surface slopes downward such that the seasonal high ground water level near the center of the Site ranges from approximately 1 to 24 feet below grade (based on the highest water level measurements in MW-1S and MW-9S). In fact, there is an artesian well in the center of the Site which flows during a portion of the year.

The location of the artesian well is shown in Plate 2. The artesian well is located near the beginning of Mill Hopper Creek, approximately 400 feet from the eastern edge of the proposed on-site containment cell, which is sized for the maximum volume capacity, in the shale pit.

Two north-south cross-sections depicting the seasonal high ground water levels are shown in Plate 3. The places where the cross-sections encounter a portion of either of the two possible on-site containment cells is also noted in Plate 3.

Based on the information in Plate 3, the seasonal high ground water level in the northeastern portion of the Site occurs at a depth of approximately 60 feet below grade. Also, the descriptive logs of borings drilled in this area (see Appendix 5C [Location Map] and Appendix 6C [Logs]) do not indicate any mottling of the soils overlying the bedrock in this area. Hence, the general limitations which apply to the distance between seasonal high or regional ground water and subbase are met in this area without any special subbase design. That is, the placement of a six inch thick subbase on bedrock in the northeast area (approximately 8 to 9 nine feet beneath ground surface; see test boring logs, FS Appendix E) would maintain a vertical isolation distance of approximately 52 feet, well above the minimum isolation distance of eight feet.

The projection of the seasonal high ground water surface across the shale pit area in Plate 3 predicts that there should be a surface water body in the shale pit area during this period. This predicted water table surface is evident in the eastern end of the shale pit where ground water flows from the artesian well and seeps occur at an approximate surface elevation of 1642 feet . This eastern portion of the shale pit is where ground water from the flowing artesian well and the seeps constitute the headwaters of Mill Hopper Creek. The approximate area of these headwaters were defined during the extended wetlands survey completed after the ERA (see Appendix 1D). However, the base of the shale pit becomes dryer to the west of these headwaters. This indicates that as ground water flows south into the area of the shale pit, the plunge in surface topography causes the hydrostatic pressure in the shallow aquifer to be greater than atmospheric pressure, at periods of seasonal high ground water levels. Consequently, ground water seeps out at the surface and flows from the artesian well in the vicinity of the origin of Mill Hopper Creek.

According to the Pennsylvania Residual Waste Management Regulations, an aquifer where the uppermost surface is at greater than atmospheric pressure is a confined aquifer. As such, this section of the regulations specify that there be at least eight feet between the top of the subbase of the liner system and the shallowest level below the subbase where ground water occurs as a result of leakage from natural or other pre-existing causes. Since the ground surface at the artesian well is approximately 1641 feet and the other ground water seeps in the vicinity of Mill Hopper Creek occur in an area where the ground surface elevation is approximately 1642 feet, special design considerations would be needed for the subbase of an on-site containment cell located in the shale pit.

In order to maintain this minimum eight foot isolation distance in the shale pit area, additional fill would be placed in this area to raise the elevation of the top of the subbase to an elevation of 1650 feet. According to the volume calculations presented in the FS Appendix D (Capacity Analysis, page 3 of 16), the capacity of the on-site containment cell from elevation

1642 to 1650 feet is approximately 8,300 cubic yards. The final design will specify the source of this fill material and the physical properties of this fill material that would be needed to meet the technical requirements stipulated in § 288.433. As described in Section 3.1.13.1 (Liner System Design) and in Appendix 11B, a ground water drainage layer will also be installed at the base of the shale pit area. Although not needed to meet the minimum vertical distance from the top of the subbase to the regional or seasonal high ground water table, this ground water drainage layer will be included in the on-site containment cell liner design for the shale pit area as an additional protective measure.

Liner and Waste Location Requirements

The regulations require that the following criteria be complied with:

1. Waste must not be placed within 15 feet of the edge of the liner.

2. A lined berm at least four feet high shall be constructed and maintained along the edge of the liner to prevent the lateral migration of leachate.

3. The edge of the liner shall be clearly marked.

Additional requirements of this section of the regulations apply to the placement of additional liner (e.g., for a landfill expansion) and are not applicable or relevant and appropriate to the construction of the on-site containment cell. The regulatory requirements listed above refer to issues that would be resolved during the final design of Remedial Alternative VI.

The final design of the on-site containment cell component of Remedial Alternative VI would specify that waste would not be placed within 15 feet of the edge of the liner. The lined berm to prevent the horizontal migration of leachate may not be needed for the construction of the on-site containment cell. The overall dimensions of the on-site containment cell, whether it is located in the shale pit or the northeast area, is relatively small compared to the dimensions of the commercial residual waste landfills which are the primary focus of the regulations. Depending on the sequence of construction to be determined during final design, the on-site containment cell may be constructed by installing the entire liner system prior to the placement of the initial layer of stabilized Site material. In this case, the sloped perimeter of the on-site containment cell liner will be installed before waste is placed and will serve as the lined berm controlling horizontal migration, if any, of leachate from stabilized Site material to be placed in the on-site containment cell. If the final design does not call for the entire liner to be installed before the initial level of waste is placed, then the final design will include a requirement to install a four foot high lined berm to control the potential horizontal migration of leachate from stabilized materials, if any.

Final details on liner construction, placement of waste relative to the edge of the liner and marking of the liner edge, all in compliance with this section of the regulations, will be provided in the final design.

3.1.17 § 288.452 Basic Treatment Methods

This section of the regulations require that leachate be collected and handled: (1) by direct discharge into a permitted publicly owned treatment works; (2) by on-site treatment and discharge into a receiving stream; or (3) by spray irrigation following treatment. However, § 288.453 provides that for the first three years following initial discharge of leachate into the collection and handling system, leachate may be handled by vehicular transportation to, an off-site treatment facility. The landfill must operate a leachate treatment plant within three years following the discharge of leachate in the collection and handling system.

3.1.17.1 Evaluation

The following evaluation addresses the leachate treatment requirements referred to in this section of the regulations. The information required by this section of the regulations is also outlined in a specific form contained in the PADER Industrial Waste Landfill Permit Application. The form is designated as Form 17R. As described below, however, this section of the regulations will not apply to the on-site containment cell since it would be constructed, filled and closed in approximately one year. Since the regulations permit off-site treatment and disposal of accumulated leachate for up to three years, and the requirements in § 288.453 only apply to operating and not closed facilities, the on-site containment cell will not be in operation long enough to require direct discharge to a publicly owned treatment works, direct discharge to a receiving stream (after treatment) or spray irrigation. The requirements for leachate treatment other than for the first year of construction, filling and closure, will be addressed in a closure plan to be submitted at the completion of final design.

The on-site containment cell proposed in Remedial Alternative VI will be constructed and closed within one year. It is unlikely that any significant amount of leachate would be generated after closure. The on-site containment cell would be constructed with a low permeable cover which would prevent the infiltration of precipitation into the waste and leachate collection system. Furthermore, the stabilized materials would probably contain stabilization agents that are hygroscopic. As a result, very little precipitation, if any, would enter the waste material and, due to the probable chemical characteristics of the waste, even less water will be able to leach through to the leachate collection system.

As discussed in Section 3.1.15.1, the requirement to use on-site treatment, then, is not applicable to conditions at the Site. Since the on-site containment cell would be closed well within the three year off-site treatment period, the regulations contained in § 288.452, which pertain to operating facilities, are not applicable. Instead, the requirements stipulated in § 288.182 and in § 288.292 regarding closure would be relevant and appropriate since closure of the on-site containment cell will occur approximately one to two years before the end of the three period when off-site leachate disposal is allowable. These closure regulations require that a closure plan describing the measures selected for leachate collection and treatment be provided. The final design plans for the on-site containment cell will describe the off-site treatment methods to be used during construction and the long-term maintenance plan (i.e., operation and maintenance plan) and will describe the methods of monitoring for and treating collected leachate. This plan will identify collection, transportation and treatment of collected leachate as the leachate treatment methods to be used after closure.

Section 4

4.0 *EVALUATION OF COST*

This section presents the cost estimates for Remedial Alternative VI (On-site Containment Cell). Two costs were estimated for Remedial Alternative VI (On-site Containment Cell), based on locating the on-site containment cell component of this alternative in either the northeast area or in the shale pit area. The cost estimates for Remedial Alternative VI (On-site Containment Cell) ranged from approximately $6.1 million for the shale pit area to approximately $7.4 million for the northeast area. This is approximately 40 to 50 percent less than the cost of Remedial Alternative V (Off-site Disposal). Cost is one of the five primary balancing criteria identified in the NCP for use in selecting a remedy. The NCP states that each remedial action selected in a ROD shall be cost-effective.

Section 4.1 presents the cost estimates, including assumptions, for Remedial Alternative VI (On-site Containment Cell) for the northeast and the shale pit areas. Section 4.2 contains a cost-effective evaluation of Remedial Alternative VI (On-site Containment Cell), including a comparison to the cost estimated for Remedial Alternative V (Off-site Disposal).

4.1 *COST ESTIMATES FOR REMEDIAL ALTERNATIVE VI*

A key element of Remedial Alternative VI (On-site Containment Cell) is the placement of stabilized Site material in an on-site containment cell. Two areas of the Site were evaluated for use as the location of an on-site containment cell: the northeast area and the shale pit area.

Cost estimates for Remedial Alternative VI (On-site Containment Cell) were initially presented in the FS based on a conceptual design of an on-site containment cell located in the shale pit area. The FS also identified and evaluated the feasibility of locating the on-site containment cell in the northeast area of the Site. However, the FS only presented cost estimates for the shale pit area. As discussed in Section 3.0 of this report, other areas of the Site could be considered for use in constructing the on-site containment cell. Hence, Section 3.0 evaluated both the northeast area and the shale pit area for compliance with the PADER residual waste landfill regulations. The NCP requires that the cost of a remedy also be evaluated as one of the five primary balancing criteria to be used in selecting a remedy. The cost for Remedial Alternative VI (On-site Containment Cell) for the northeast and the shale pit areas were estimated in order to perform this evaluation. The results (costs) and the factors used to estimate these costs are presented below.

Costs

The costs for Remedial Alternative VI (On-site Containment Cell) were estimated based on the factors described below. The capital costs, annual operation and maintenance (O&M) costs and the total present worth costs of this alternative were estimated for the northeast and the shale pit area. In accordance with the cost estimating guidelines presented in Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA/540/6-89/004; October 1988) and to be consistent with the cost estimates presented in the FS and the ROD, the costs presented here include a 50 percent additional cost factor. This 50 percent additional cost factor reflects the following: mobilization, site preparation and demobilization (10 percent); engineering design and construction oversight (15 percent); and contingency (25 percent). The results are as follows:

Estimated Costs for Remedial Alternative VI (On-site Containment Cell):

A. Northeast Area On-site Containment Cell:

Capital Costs =	$6,996,000
Total Present Worth, O&M Costs =	$429,300
Total Present Worth, All Costs, Northeast Area =	**$7,425,300**

B. Shale Pit Area On-site Containment Cell:

Capital Costs =	$5,702,450
Total Present Worth, O&M Costs =	$410,440
Total Present Worth, All Costs, Shale Pit Area =	**$6,112,890**

A detailed description of these costs is presented in Appendix 13. The total annual O&M cost for Remedial Alternative VI (On-site Containment Cell) based on the use of the shale pit area would be approximately $34,820. The total annual O&M cost for Remedial Alternative VI (On-site Containment Cell) based on the use of the northeast area would be approximately $36,420. These costs reflect the work required to stabilize soil containing lead in concentrations greater than 500 ppm and other Site material and placement in either the northeast or the shale pit area. Other factors used to develop these cost estimates are presented below. Section 4.2 contains an evaluation of these costs with respect to Remedial Alternative V (Off-site Disposal), the alternative conditionally selected in the ROD.

Factors Used in Estimating Costs for Remedial Alternative VI

The costs presented above for Remedial Alternative VI (On-site Containment Cell) reflect changes to the design of the on-site containment cell as initially presented in the FS, including changes in cleanup levels stated in the ROD and modifications to the design to more clearly address certain requirements in the PADER residual waste landfill regulations. These changes, described in Sections 4.1.1 to 4.1.7, are summarized as follows:

1. The FS design of the on-site containment cell was based on a quantity of soil to be remediated calculated using a proposed 1,000 ppm lead cleanup level for on-site soil. This lead cleanup level was revised in the ROD to 500 ppm, resulting in an increase in the amount of soil to be remediated.

2. The cost of the on-site containment cell presented in the FS was based on the maximum capacity available in the shale pit area on-site containment cell for the placement of stabilized Site material. The cost of Remedial Alternative V (Off-site Disposal), however, was based on the quantity of Site material to be stabilized, which is significantly less than the maximum capacity of the shale pit on-site containment cell. In order to perform a more equitable comparison to the cost of Remedial Alternative V (Off-site Disposal), the on-site containment cell costs were revised to reflect the cost of an on-site containment cell sized to handle the volume of stabilized Site material used to estimate the cost of Remedial Alternative V (Off-site Disposal). This approach was used for the costs for the shale pit area and for the northeast area.

3. The costs presented in the FS for Remedial Alternative VI (On-site Containment Cell) were based on the use of the shale pit area only. Separate costs are presented here for Remedial Alternative VI (On-site Containment Cell) based on the use of the shale pit area and on the use of the northeast area.

4. The design of the on-site containment cell in the shale pit area was revised to increase the isolation distance beneath the top of the subbase and ground water.

5. The FS used an overly conservative assumption that the volume of stabilized Site material would increase by ten percent due to the addition of stabilization agents. Although the weight of stabilized Site material would increase by ten percent, the Stabilization Treatability Study demonstrated that the volume of Site material after stabilization would remain the same or possibly even decrease.

6. Unit costs were revised to reflect slight changes in the cost of certain cell components such as soil and drainage sand.

7. The liner system for the on-site containment cell presented in the FS was revised to more clearly demonstrate compliance with PADER residual waste regulations. For example, the cost of piping systems and manholes for the leachate collection and the leachate detection zones were included in the costs presented here for the on-site containment cell.

4.1.1 Cost Adjustment: Revised Lead Cleanup Level (500 ppm)

The FS proposed a lead cleanup level of 1,000 ppm for on-site soil and estimated that approximately 18,500 cubic yards of soil would require remediation (a total of 20,585 cubic yards of Site material, including soil, ash and sediment). However, the ROD selected a lead cleanup level of 500 ppm for on-site soil. As discussed in Section 3.0 (Weight and/or Volume of Waste), the amount of soil to be remediated to meet this revised lead cleanup level was estimated to be approximately 26,300 cubic yards (a total of 28,400 cubic yards, including soil, ash and sediment). As a result, the design of the on-site containment cell presented in this report was evaluated for its capacity to handle the revised quantity of Site material (28,400 cubic yards) to be stabilized and placed in the cell. This capacity analysis is described in Section 4.1.2.

4.1.2 Cost Adjustment: Appropriate Capacity Basis

The evaluation of the on-site containment cell presented in the FS focused on the shale pit area. The maximum capacity of the shale pit area to contain stabilized material was determined in the FS based on the use of the entire western half of the shale pit as the location of the cell. The maximum capacity of this area for the placement of stabilized material was determined in the FS (Section 4.9.1 (e) of the FS) to be approximately 59,400 cubic yards. If this were adjusted to reflect the increase in the thickness of the subbase described in Section 4.1.4 of this report, the maximum capacity of the shale pit area would be 53,400 cubic yards. The FS concluded that this was more capacity than would be needed for the placement of the stabilized material. The FS stated that the "...remaining excess capacity of the shale pit can be reduced by decreasing the east-west dimensions of..." the on-site containment cell. However, the estimated costs to construct the on-site containment cell in the shale pit area, as presented in the FS (Appendix F), were based on the maximum capacity of 59,400 cubic yards.

This is a conservative approach to estimate the cost of Remedial Alternative VI (On-site Containment Cell), since the cost for Remedial Alternative V (Off-site Disposal) presented in the FS was based on the quantity of stabilized material to be remediated (i.e., 20,585 cubic yards), not the maximum quantity of stabilized material that could be placed in the shale pit area (i.e., 59,400 cubic yards). In order to provide an equal basis with which to compare Remedial Alternative VI (On-site Containment Cell) with Remedial Alternative V (Off-site Disposal), the costs for Remedial Alternative VI (On-site Containment Cell) were revised to reflect waste quantities and not maximum capacities. This cost sensitivity analysis (see Section 6.2.3.7, Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA) is designed to address the effects of varying waste quantities on remedial alternative costs.

The dimensions of the on-site containment cell for the northeast and for the shale pit areas were refined from those shown in Plates 1 and 2 and discussed in Section 3.0. The overall horizontal and vertical dimensions of the cells were reduced to more closely approximate the volume that would be needed to contain stabilized Site material (i.e., approximately 28,400 cubic yards, as presented in the ROD for the 500 ppm lead cleanup level for on-site soil). The dimensions of the base or footprint of each cell was reduced and the slope of the final cover was increased. As presented in the work sheets contained in Appendix 13A, the dimensions of the shale pit, sized to contain stabilized Site material and not the maximum available capacity, would be as follows:

east-west length:	approximately 300 feet
north-south width (at top of embankment):	approximately 177 feet
height at center:	approximately 25 feet

A north-south cross-section of the revised shale pit on-site containment cell is presented in the work sheets contained in Appendix 13A. The total available capacity of this configuration would be approximately 36,580 cubic yards. This does not include the approximately 8,300 cubic yards of capacity in the shale pit that would be used to construct the subbase to an elevation of 1650, as discussed in Section 4.1.4. Approximately 6,880 cubic yards of material would be needed to construct the 3.5 foot thick liner system described in Section 4.1.7, leaving approximately 29,700 cubic yards (i.e., 36,580 - 6,880) for the placement of stabilized Site materials. The final cover for the shale pit cell would be placed over the stabilized material and would not occupy available capacity. As described in Section 4.1.5, only 28,400 cubic yards of capacity would be needed for the placement of stabilized material. This would leave approximately 1,300 cubic yards of excess capacity. By contrast, the shale pit on-site containment cell presented in the FS contained approximately 36,755 cubic yards of excess capacity.

A similar analysis was performed for the northeast area cell. The location of the cell was moved slightly to the south and west, as shown in the work sheets included in Attachment 13B. This would increase the buffer zone between the cell and the property line from that shown in Plates 1 and 2 and discussed in Section 3.0. As discussed in Section 3.1.14, the buffer zones shown in Plates 1 and 2 for the on-site containment cell, *sized to* reflect maximum capacity, complies with the criteria contained in § 288.422 of the PADER residual waste landfill regulations. This buffer zone was increased in the cost estimate design (i.e., sized to meet estimated quantities of stabilized material, not maximum capacity). As a result, the increased buffer zone would provide additional protection.

The shape of the base or footprint of the northeast area cell, as presented in Appendix 13B, would be an isosceles triangle (i.e., two equal sides). The length of the two equal sides would be approximately 500 feet; the length of the third side would be approximately 700 feet. The area of the base or footprint of the northeast cell would be approximately 122,500 square feet. The height of the cell, measured near the northern and deepest part of the cell, would be approximately 24 feet. The average height of the cell (approximate depth of waste) would be approximately 12 feet.

The cell would be constructed by excavating the soil and rock in this area to create the base or footprint for the cell. There is a maximum of approximately four feet of soil in this area, as shown on the RI Figure 3-11. All of this soil (i.e., approximately four feet) would be removed from the northeast cell area in order to exposed the underlying bedrock. The exposed bedrock would be excavated to provide a stable foundation for the base of the cell (see FS Appendix E, Geotechnical Report). Rock excavation would begin at the southern base of the cell (i.e., the 700 foot length) and continue north, reducing the slope from the existing 11 percent grade to a maximum slope of approximately 5 percent.

The liner system, stabilized material and final cover would then be placed and the cell would be closed. The final slope of the cover would range from the maximum 3 percent slope at the northern end of the cell to the maximum 33 percent slope at the southern end. The final cover would conform to the general slope of the existing ground surface. The total capacity of this cell would be approximately 66,300 cubic yards. However, approximately 31,800 cubic yards would be needed to construct the liner system and the final cover. (Because of the slope of the northeast cell final cover, capacity would be used when the cover is installed.) This would leave approximately 34,500 cubic yards for waste placement. As discussed in Section 4.1.5 , only 28,400 cubic yards of capacity would be needed for the placement of stabilized Site material. This would leave approximately 6,100 cubic yards of excess capacity in the northeast cell. By contrast, the shale pit on-site containment cell presented in the FS contained approximately 36,755 cubic yards of excess capacity.

4.1.3 Cost Adjustment: Northeast Area

The cost estimates presented in the FS for Remedial Alternative VI (On-site Containment Cell) were based on the use of the shale pit area only. As discussed in Section 1.0 of this report, the FS focus on the shale pit was not meant to suggest the shale pit area was the only location on the Site where an on-site containment cell could be placed. As part of the information presented here, both the shale pit and the northeast areas were evaluated. The cost of implementing Remedial Alternative VI (On-site Containment Cell) using either the northeast area of the Site or the shale pit area was estimated for this report to demonstrate the overall cost-effectiveness of Remedial Alternative VI (On-site Containment Cell).

4.1.4 Cost Adjustment: Shale Pit Subbase Modification

The PADER residual waste regulations require that a minimum isolation distance be maintained between the top of the subbase and the seasonal high and the regional ground water table. As described in Section 3.1.16, General Limitations (Ground Water Isolation Distance Requirements), the top of the subbase in the shale pit area would need to be at elevation 1650 to comply with this requirement. This would require the placement of approximately 8,300 cubic yards (from FS Appendix D, Capacity Analysis, page 3 of 16) of permeable soil to this level. As a result, the cost of placing 8,300 cubic yards of permeable soil was included in the cost estimate for the shale pit area subbase. A system of perforated pipes (six inch diameter, maximum distance of 100 feet) to be installed in the subbase, although not needed to comply with these regulatory requirements, was also included in this cost estimate.

As discussed in Section 3.1.16 (Ground Water Isolation Distance Requirements), ground water occurs at a depth of approximately 60 feet in the northeast area of the Site. As described above, a maximum depth of 24 feet of soil and rock would be excavated for the northeast area cell. This would leave approximately 36 feet between ground water and the bottom of the cell, well above the minimum isolation distance of 8 feet. As a result, the subbase depth would need to be no more than the 6 inches required by the PADER residual waste landfill regulations.

4.1.5 *Cost Adjustment: Effect of Stabilization on Volume*

The volume of stabilized Site material to be placed in the on-site containment cell was computed in the FS to consist of the volume of soil, ash and sediment to be stabilized plus an additional ten percent volume increase for stabilization agents. As discussed in Section 3.1.4, Facility Plan (Weight and/or Volume of Waste), the Stabilization Treatability Study (Appendix A of the FS) determined that the stabilization agent (i.e., portland cement) effective in immobilizing Site material did not result in any increase in volume. Tables 8 and 9 of the Stabilization Treatability Study (see Appendix 3A of this report) reported that a ten percent addition of portland cement actually results in a three percent decrease in soil volume and a four percent decrease in ash volume. As a result, the volume of stabilized Site material to be placed in the on-site containment cell is equal to the volume of Site material (i.e., *not including stabilization* agents). As discussed in Section 3.1.4, Facility Plan (Weight and/or Volume of Waste), the total volume of stabilized Site material to be placed in the on-site containment cell based on an on-site lead cleanup level of 500 ppm is 28,358 cubic yards (approximately 28,400 cubic yards).

The weight of stabilized Site material to be disposed off-site, however, would include the weight of stabilization agent (estimated as ten percent of the weight of Site material). Since charges for off-site disposal are based on weight (tons) and not volume, this does not affect the cost of Remedial Alternative V (Off-site Disposal).

4.1.6 Cost Adjustment: Unit Costs

Potential changes in the unit costs for providing and installing on-site containment cell liner and cover components was evaluated by a review of recent bids for similar work performed in this region. A recent (1992) bid submitted to and accepted by the New Jersey Department of Environmental Protection for the remediation of a landfill at a CERCLA site in western New Jersey provided information on current unit prices for soil, topsoil and permeable soil (drainage sand). These costs were slightly different from those used in the FS (i.e., soil and sand costs were higher and topsoil costs were lower than those used in the FS). In addition, unit costs were developed for items included in cost estimates presented here but were not included in the FS. These unit costs are for the following items: (1) a composite secondary liner consisting of HDPE and bentonite; and (2) perforated piping and manhole sumps. The piping and manholes were included in the cost of the leachate collection and leachate detection zones for the on-site containment cell. The unit costs used in the cost estimates presented here and the source of this information is presented in the cost tables included in Appendix 13.

4.1.7 *Revised Liner System Design*

The FS presented a conceptual design of a liner system that would be used in the construction of an on-site containment cell. The PADER residual waste landfill regulations describe requirements for five separate zones comprising a liner system. The conceptual liner design presented in the FS was modified for this submission to identify the components of the liner system in terms of these five zones and to address the recent PADER residual waste regulations. This modified liner system design (see Appendix 11B of this report for cross-section) was described in Section 3.1.13, Liner System and Leachate Collection Plan (Liner System Design). This modified liner system design was used to estimate the cost, presented earlier, of constructing the on-site containment cell in either the shale pit area and in the northeast area.

4.2 *COST EFFECTIVE EVALUATION*

The total cost presented in the ROD for Remedial Alternative V, Off-site Disposal, is approximately $12 million. The changes in cell design or unit costs used in estimating the cost of Remedial Alternative VI, On-site Containment Cell (as discussed above) did not apply to the remedial actions contained in Remedial Alternative V (Off-site Disposal). As a result, the ROD cost for Remedial Alternative V (Off-site Disposal) of approximately $12 million is a viable and accurate estimate of the cost of off-site disposal.

This report focused its evaluation on two possible areas for construction of an on-site containment cell. These two possible locations were in the northeastern and the shale pit areas of the Site. The detailed evaluation in this report resulted in certain changes to the design of the on-site containment cells to address issues raised by USEPA and PADER and to more clearly demonstrate compliance with the promulgated PADER

Residual Waste Management Regulations. Therefore, the total costs for Remedial Alternative VI (On-site Containment Cell), estimated based on locating the on-site containment cell in either the northeast area or the shale pit area, are as follows:

Remedial Alternative VI (On-site Containment Cell),
northeast area, on-site containment cell = $7,425,300

Remedial Alternative VI (On-site Containment Cell),
shale pit area, on-site containment cell = $6,112,890

The cost of Remedial Alternative V (Off-site Disposal) ranges from over 1.5 times (for the northeast area cell) to almost twice (for the shale pit area cell) the cost of Remedial Alternative VI (On-site Containment Cell). The NCP at 300.430(f)(1)(D) states that cost-effectiveness is determined by evaluating three of the five balancing criteria: (1) long-term effectiveness and permanence; (2) reduction of toxicity, mobility or volume through treatment; and (3) short-term effectiveness. The NCP also states that a remedy shall be cost-effective if its costs are proportional to its overall effectiveness. The evaluation of these three balancing criteria presented in the ROD concluded that implementation of Remedial Alternative VI (On-site Containment Cell) is more effective in meeting these criteria than is implementation of Remedial Alternative V (Off-site Disposal).

With respect to long-term effectiveness and permanence, the ROD states that Remedial Alternative V (Off-site Disposal) and Remedial Alternative VI (On-site Containment Cell) presents the greatest reduction of the overall risk posed by the Site since soil, ash and sediment would be stabilized. However, the ROD also noted that Remedial Alternative V (Off-site Disposal) may not be as effective in meeting this criteria for the following reasons:

1. The off-site disposal facility (Remedial Alternative V, Off-site Disposal) should have a liner both above and beneath the waste to be as effective as the on-site containment cell. The ROD notes that this is not a requirement of all non-hazardous waste landfills. The ROD also states that the liner above and beneath the waste in the on-site containment cell (Remedial Alternative VI, On-site Containment Cell) best minimizes infiltration through the stabilized Site material. The ROD concluded that the presence of a proper liner system is only ensured in Remedial Alternative VI (On-site Containment Cell).
2. The ROD states that Remedial Alternative V (Off-site Disposal) would only be as reliable as Remedial Alternative VI (On-site Containment Cell) if the operator of the off-site disposal facility properly maintains the facility, separates the wastes by type to ensure that co-disposal of stabilized Site material with waste which may affect the stabilized material does not occur, and the integrity of the stabilized material is not compromised prior to final capping of the facility. In Remedial Alternative VI (On-site Containment Cell), the on-site containment cell would only contain similar waste and would be capped immediately.

With respect to reductions in mobility, toxicity or volume, the ROD stated that both Remedial Alternatives V (Off-site Disposal) and VI (On-site Containment Cell) included treatment using stabilization of Site material, thus reducing the mobility and toxicity of chemicals in Site materials. However, the ROD noted that Remedial Alternative VI (On-site Containment Cell) is especially effective in preventing any potential for waste to be de-stabilized, since Remedial Alternative VI (On-site Containment Cell) would easily prevent the possibility of co-disposal with potential harmful waste. As discussed above, co-disposal with potentially harmful waste could occur if Remedial Alternative V (Off-site Disposal) were implemented.

With respect to short-term effectiveness, the ROD states that Remedial Alternative V (Off-site Disposal) is the only alternative which may cause additional short-term impacts during implementation. The transportation of stabilized Site material to an off-site disposal facility (Remedial Alternative V, Off-site Disposal) would require over 2,000 trucks to enter and leave the Site. The ROD noted that this would cause Remedial Alternative V (Off-site Disposal) to generate higher levels of air pollutants than would Remedial Alternative VI (On-site Containment Cell).

It is apparent, then, that Remedial Alternative VI (On-site Containment Cell) is more effective in addressing these three balancing criteria than is Remedial Alternative V (Off-site Disposal). Since the cost of Remedial Alternative VI (On-site Containment Cell), based on the use of the northeast or the shale pit areas, is 40 to 50 percent less than the cost of Remedial Alternative V (Off-site Disposal), it is clear that Remedial Alternative VI (On-site Containment Cell) is significantly more cost-effective than Remedial Alternative V (Off-site Disposal).

Section 5

5.0 SUMMARY EVALUATION AND CONCLUSION

This section briefly summarizes the elements of the more focused evaluation of the construction of an on-site containment cell at the Site and compares the on-site containment cell option to the remedy selected in the ROD. This comparison highlights the issue of protection of human health and the environment, compliance with ARARs and cost.

In addition, this section briefly discusses the State and Community Acceptance criteria as they relate to the more focused evaluation and eventual selection of a final remedy for the Site. This brief discussion is based upon the NCP, detailed information presented in this evaluation report and elements of the responsiveness summary attached to the ROD.

Lastly, based on this technical and regulatory compliance evaluation, a conclusion is reached regarding the placement of stabilized materials in an on-site containment cell at the Site.

5.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, COMPLIANCE WITH ARARs, AND COST

The protection of human health and environment is one of two threshold criteria which must be met for a remedy to be selected at the Site. It has already been established in the ROD that the remedial alternatives which include either placement of stabilized material in an on-site containment cell or removal for disposal off-site significantly reduce or eliminate potential environmental impacts by preventing migration of contaminated material from the Site (see ROD page 56). As mentioned in section 2.0, the ROD indicates there is no difference in the level of protection of human health or the environment between the placement of the stabilized material in an on-site containment cell versus removal of this material off-site for disposal. Hence, this threshold evaluation criterion was equally achieved by the on-site remedy.

The ROD Documentation of Significant Differences did not indicate any change in the analysis or new data to suggest the placement of stabilized materials in an on-site containment cell was less protective of human health and the environment. Furthermore, this more focused evaluation shows that the construction of an on-site containment cell at the Site complies with those aspects of the PA Residual Waste Management Regulations which pertain to the public health and safety. Consequently, the two possible proposed locations of an on-site containment cell at the Site which were considered in this evaluation report are equally, or more protective of human health and the environment than the remedy which would result in off-site disposal of stabilized materials.

The second threshold criterion which must be met in order for a remedy to be selected is compliance with ARARs. The FS Report detailed a number of ARARs which pertain to the planned remedial activities at the Site. These ARARs were chemical-specific, location specific and action-specific. The evaluation of the remedial alternative which involved placing the stabilized materials in an on-site containment cell incorporated procedures which ensured compliance with both Federal and State ARARs. At the time of the FS Report, the PA Residual Waste Management Regulations had not yet been promulgated. Nevertheless, the proposed PA Residual Waste Management Regulations were identified in the FS Report as To Be Considered (TBC) items when assessing compliance of the remedy involving placement of stabilized materials in an on-site containment cell.

This more focused evaluation elaborates on the issue of compliance of an on-site containment cell with the promulgated, final PA Residual Waste Management Regulations. (The sections of these final regulations which are addressed in this evaluation report are essentially unchanged from the proposed regulations which were evaluated in the FS Report as TBC). This report addresses the specific sections of the PA Residual Waste Management Regulations which were highlighted by USEPA and PADER as requiring more elaboration..

As a result of this more focused evaluation, the conceptual containment cell design in the shale pit location was modified from what was presented in the FS Report. Specifically, the thickness of the subbase, for a containment cell constructed in the shale pit, was increased to allay any concerns regarding minimum distance between the stabilized materials and the seasonal high ground water. Additionally, this more focused evaluation of compliance with the State ARAR defined as the PA Residual Waste Management Regulations shows that an alternative location at the Site can also be used to construct an on-site containment cell. This location is in the northeastern section of the Site. Although this area was considered in the FS Report and found to be suitable for an on-site containment cell, it did not undergo the same detailed evaluation in the FS Report as was completed for the shale pit location.

A more focused evaluation of the sections of the PA Residual Waste Management Regulations referenced by USEPA and PADER show that an on-site containment cell complies with this State ARAR.

The total cost presented in the ROD for the selected remedy (off-site disposal) is approximately $12 million. This approximate $12 million amount is a reliable estimate of the cost of off-site disposal.

This report focused its evaluation on two possible areas for construction of an on-site containment cell. These two possible locations were in the northeastern and the shale pit areas of the Site. The detailed evaluation in this report resulted in certain changes to the design of the on-site containment cell to address issues raised by USEPA and PADER and to more clearly demonstrate compliance with the promulgated PADER Residual Waste Management Regulations. Therefore, the total costs for Remedial Alternative VI (on-site containment), estimated based on locating the on-site containment cell in either the northeast area or the shale pit area, are as follows:

Remedial Alternative VI, northeast area, on-site containment cell =	$7,425,300
Remedial Alternative VI, shale pit area, on-site containment cell =	$6,112,890

The cost of Remedial Alternative V (off-site disposal) ranges from over 1.5 times (for the northeast area cell) to almost twice (for the shale pit area cell) the cost of Remedial Alternative VI (on-site containment). As discussed in section *4.0*, the NCP at 300.430(f)(1)(D) states that cost-effectiveness is determined by evaluating three of the five balancing criteria: (1) long-term effectiveness and permanence; (2) reduction of toxicity, mobility or volume through treatment; and (3) short-term effectiveness. The NCP also states that a remedy shall be cost-effective if its costs are proportional to its overall effectiveness. The evaluation of these three balancing criteria presented in the ROD concluded that implementation of Remedial Alternative VI (on-site containment) is more effective in meeting these criteria than is implementation of Remedial Alternative V.

In summary, placement of stabilized material in an on-site containment cell is consistent with the procedures to select a preferred alternative based on the two threshold evaluation criteria as set forth in the NCP. Furthermore, it is apparent that the on-site containment option is significantly more cost-effective than removal of stabilized materials to an off-site location.

5.2 STATE AND COMMUNITY ACCEPTANCE

These two evaluation items are modifying criteria under the NCP which the USEPA considers after an official comment period on the proposed plan.

The Documentation of Significant Differences in the ROD indicates that, although there was no information which would preclude the placement of stabilized materials in an on-site containment cell, the Commonwealth of Pennsylvania could not concur with the construction of a containment cell until more information was provided regarding compliance with the PA Residual Waste Management Regulations. In essence, this evaluation report sets forth the more focused evaluation of how the proposed on-site containment cell locations complies with the relevant sections of the PA Residual Waste Management Regulations which were cited by USEPA and PADER as requiring additional information.

The more focused evaluation of the relevant sections of the PA Residual Waste Management Regulations provides the information which the State needs to judge whether the on-site containment cell concept complies with the aforementioned regulations. Additionally, this more focused evaluation gives the USEPA a detailed analysis of the technical and regulatory aspects of the on-site containment cell to assist in a further review of a final remedy in accordance with the agency's authority under CERCLA.

Certain members of the community who attended the public meeting on the proposed plan and provided comments to the USEPA were opposed to the placement of stabilized materials in an on-site containment cell. The Documentation of Significant differences in the ROD mentions that the community favored off-site disposal of the stabilized materials.

In the responsiveness summary in the ROD, the USEPA indicates that, "Rejection of EPA's proposed alternative by the public is not in and of itself a reason to change the remedy" (see response to question #4). This response suggests that for the USEPA to change a remedy because of public opposition, specific information to indicate that the remedy is not protective or not a sound technical decision should be forthcoming. Simply removing the stabilized materials to an off-site disposal location just transfers the stabilized materials to a different geographic location where another community exists. That different geographic location may not be as protective of human health and the environment and, that community has not yet been polled as to their acceptance of the stabilized material.

It is unknown whether the more focused evaluation in this document will alter the impression which is currently held by certain members of the community regarding the placement of stabilized material in an on-site containment cell. Nevertheless, the additional information which is provided in this document should assist all community members in a further review of the on-site containment cell option. The expanded evaluation of the on-site containment cell in this document goes beyond the information contained in the FS Report and tracks key provisions of the PA Residual Waste Management Regulations which relate to potential impacts to the public and environment.

5.3 CONCLUSION

The more focused evaluation in this document conforms to the provisions in the ROD which provided a 180 day time frame for a demonstration that the on-site containment cell (Remedial Alternative VI) is equally or more protective, complies with all ARARs and is cost effective. Furthermore, this evaluation responds to the USEPA and PADER requests for elaboration on specific sections of the PA Residual Waste Management

Regulations as they pertain to construction of an on-site containment cell at the Site.

This more focused evaluation included collection of additional information which lead to modifications in some of the conceptual design components of the on-site containment cell located in the shale pit. Additionally, this evaluation shows that there is more than one suitable location at the Site for construction of an on-site containment cell.

Based on the detailed evaluation presented in this document, the following conclusions are drawn:

1) placement of stabilized materials in an on-site containment cell would be equally or more protective of human health and the environment than removal of these materials for off-site disposal;

2) the construction of an on-site disposal cell at the Site complies with the substantive aspects of the PA Residual Waste Management Regulations; and,

3) the construction of an on-site containment cell at the Site is more cost-effective than removing the stabilized material off-site for disposal. In fact, the on-site remedy is 40 to 50 percent less than the off-site disposal option.

In summary, this more focused evaluation of the technical and regulatory compliance of an on-site containment cell at the Site should enable the USEPA to make a determination that the ROD should be modified to select the on-site remedy.